DETAILED PROJECT REPORT

VOLUME IV B – TOPOGRAPHICAL SURVEY

SEMI HIGH SPEED RAIL CORRIDOR
THIRUVANANTHAPURAM TO KASARAGOD

KERALA RAIL DEVELOPMENT CORPORATION LTD

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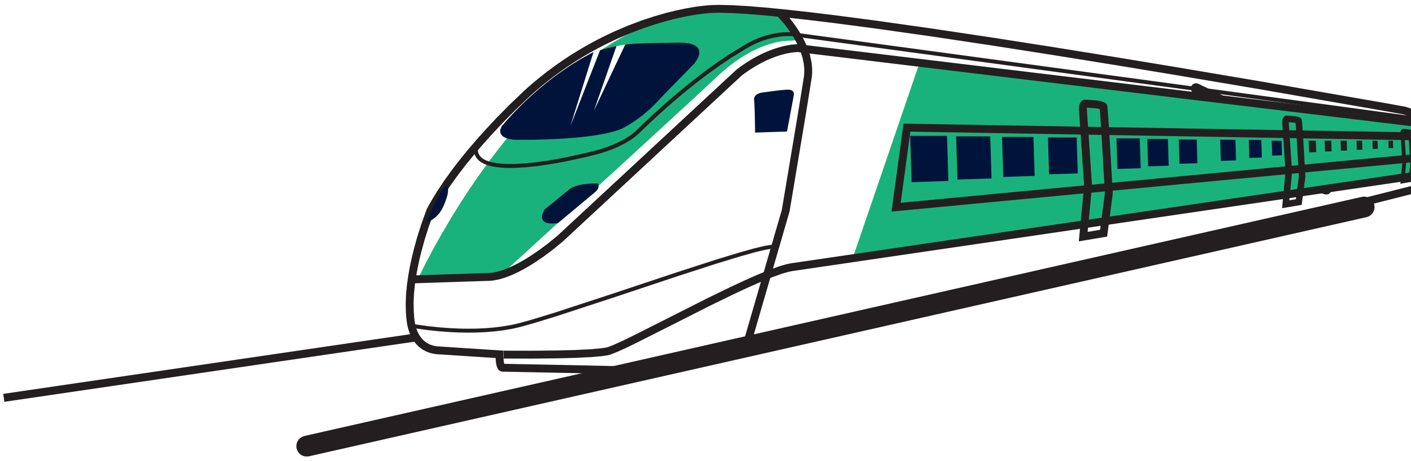

AERIAL LIDAR SURVEY FOR THIRUVANANTHAPURAM – KASARAGOD SEMI-HIGH-SPEED RAIL CORRIDOR

LiDAR PROJECT REPORT

KERALA RAIL DEVELOPMENT CORPORATION LIMITED

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GLOSSARY

ACCURACY	The closeness of an estimated value (for example, measured or computed) to a standard or accepted (true) value of a particular quantity.
ACCURACY, ABSOLUTE	A measure that accounts for all systematic and random errors in a dataset. Absolute accuracy is stated with respect to a defined datum or reference system.
ACCURACY, HORIZONTAL	The horizontal (radial) component of the positional accuracy of a dataset with respect to a horizontal datum, at a specified confidence level. *See* accuracy$_r$.
ACCURACY, NETWORK	The uncertainty in the coordinates of mapped points with respect to the geodetic datum at the 95-percent confidence level.
ACCURACY, POSITIONAL	The accuracy at the 95-percent confidence level of the position of features, including horizontal and vertical positions, with respect to horizontal and vertical datums.
ACCURACY, RELATIVE	A measure of variation in point-to-point accuracy in a dataset. In light detection and ranging (lidar), this term may also specifically mean the positional agreement between points within a swath, adjacent swaths within a lift, adjacent lifts within a project, or between adjacent projects.
ACCURACY, VERTICAL	The measure of the positional accuracy of a dataset with respect to a specified vertical datum at a specified confidence level or percentile. *See* accuracy$_z$.
AGGREGATE NOMINAL PULSE DENSITY (ANPD)	A variant of nominal pulse density that expresses the total expected or actual density of pulses located in a specified unit area resulting from multiple passes of the lidar instrument, or a single pass of a platform with multiple lidar instruments, over the same target area. In all other respects, ANPD is identical to nominal pulse density (NPD). In single coverage collection, ANPD and NPD will be equal. *See* aggregate nominal pulse spacing, nominal pulse density, nominal pulse sSpacing.
AGGREGATE NOMINAL PULSE SSPACING (ANPS)	A variant of nominal pulse spacing that expresses the typical or average lateral distance between pulses in a lidar dataset resulting from multiple passes of the lidar instrument, or a single pass of a platform with multiple lidar instruments, over the same target area. In all other respects, ANPS is identical to nominal pulse spacing (NPS). In single coverage collections, ANPS and NPS will be equal. *See* aggregate nominal pulse density, nominal pulse density, nominal pulse spacing.
ATTITUDE	The position of a body defined by the angles between the axes of the coordinate system of the body and the axes of an external coordinate system. In photogrammetry, the attitude is the angular orientation of a camera (roll, pitch, yaw), or of the photograph taken with that camera, with respect to some external reference system. With lidar, the attitude is normally defined as the roll, pitch, and heading of the instrument at the instant an active pulse is emitted from the sensor.
BARE-EARTH (BARE EARTH)	Digital elevation data of the terrain free from vegetation, buildings, and other man-made structures. Elevations of the ground.

BORESIGHT	Calibration of a lidar sensor system equipped with an Inertial Measurement Unit (IMU) and Global Positioning System (GPS) to determine or establish the accurate position of the instrument (*x, y, z*) with respect to the GPS antenna and orientation (roll, pitch, heading) of the lidar instrument with respect to straight and level flight.
BREAKLINE	A linear feature that describes a change in the smoothness or continuity of a surface. The two most common forms of breaklines are as follows:
BREAKLINE, HARD	defines interruptions in surface smoothness (for example, to define streams, rivers, shorelines, dams, ridges, building footprints, and other locations) with abrupt surface changes. Although some hard breaklines are 3D breaklines, they are typically depicted as 2-dimensional (2D) breaklines because features such as shorelines and building footprints are normally depicted with series of *x, y* coordinates only, which are often digitized from digital orthophotos that include no elevation data.
BREAKLINE, SOFT	Ensures that known *z*-values along a linear feature are maintained (for example, elevations along a pipeline, road centerline, or drainage ditch), and ensures that linear features and polygon edges are maintained in a triangulated irregular network (TIN) surface model by enforcing the breaklines as TIN edges. They are generally synonymous with 3-dimensional (3D) breaklines because they are depicted with series of *x, y, z* coordinates. Somewhat rounded ridges or the trough of a drain may be collected using soft breaklines.
CALIBRATION (LIDAR SYSTEMS)	The process of identifying and correcting for systematic errors in hardware, software, or data. Determining the systematic errors in a measuring device by comparing its measurements with the markings or measurements of a device that is considered correct. Lidar system calibration falls into two main categories:
CELL (PIXEL)	A single element of a raster dataset. Each cell contains a single numeric value of information representative of the area covered by the cell. Although the terms "cell" and "pixel" are synonymous, in this specification "cell" is used in reference to nonimage rasters such as digital elevation models (DEMs), whereas "pixel" is used in reference to image rasters such as lidar intensity images.
CHECK POINT (CHECKPOINT)	A surveyed point (*x, y* or *x, y, z*) used to estimate the positional accuracy of a geospatial dataset against an independent source of greater accuracy. Check points are independent from, and may never be used as, control points on the same project.
CLASSIFICATION (OF LIDAR)	The classification of lidar point cloud returns in accordance with a classification scheme to identify the type of target from which each lidar return is reflected. The process allows future differentiation between bare-earth terrain points, water, noise, vegetation, buildings, other man-made features, and objects of interest.
CONFIDENCE LEVEL	The percentage of points within a dataset that are estimated to meet the stated accuracy; for example, accuracy reported at the 95-percent confidence level means that 95 percent of the positions in the dataset will have an error with respect to true ground position that are equal to or smaller than the reported accuracy value.

CONSOLIDATED VERTICAL ACCURACY (CVA)	Replaced by the term vegetated vertical accuracy (VVA) in this specification, CVA is the term used by the National Digital Elevation Program (NDEP) guidelines for vertical accuracy at the 95th percentile in all land cover categories combined (NDEP, 2004). *See* percentile, vegetated vertical accuracy.
CONTROL POINT (CALIBRATION POINT)	A surveyed point used to geometrically adjust a lidar dataset to establish its positional accuracy relative to the real world. Control points are independent from, and may never be used as, check points on the same project.
DATA VOID	In lidar, a gap in the point cloud coverage caused by surface nonreflectance of the lidar pulse, instrument or processing anomalies or failure, obstruction of the lidar pulse, or improper collection flight planning. Any area greater than or equal to four times the ANPS, squared, measured using first returns only, is considered to be a data void.
DATUM	A set of reference points on the Earth's surface against which position measurements are made, and (usually) an associated model of the shape of the Earth (reference ellipsoid) to define a geographic coordinate system. Horizontal datums (for example, the North American Datum of 1983 [NAD 83]) are used for describing a point on the Earth's surface, in latitude and longitude or another coordinate system. Vertical datums (for example, the North American Vertical Datum of 1988 [NAVD 88]) are used to measure elevations or depths. In engineering and drafting, a datum is a reference point, surface, or axis on an object against which measurements are made.
DIGITAL ELEVATION MODEL (DEM)	DEM is the digital cartographic representation of the elevation of the land at regularly spaced intervals in *x* and *y* directions, using *z*-values referenced to a common vertical datum.
DIGITAL ELEVATION MODEL RESOLUTION	The linear size of each cell of a raster DEM. Features smaller than the cell size cannot be explicitly represented in a raster model. DEM resolution may also be referred to as cell size, grid spacing, or ground sample distance.
DIGITAL SURFACE MODEL (DSM)	Similar to DEMs except that they may depict the elevations of the top surfaces of buildings, trees, towers, and other features elevated above the bare-earth. DSMs are especially relevant for telecommunications management, air safety, forest management, and 3D modeling and simulation.
DIGITAL TERRAIN MODEL (DTM)	DTM” is a vector dataset composed of 3D breaklines and regularly spaced 3D mass points, typically created through stereo photogrammetry, that characterize the shape of the bare-earth terrain. Breaklines more precisely delineate linear features whose shape and location would otherwise be lost. A DTM is not a surface model and its component elements are discrete and not continuous; a TIN or DEM surface must be derived from the DTM. Surfaces derived from DTMs can represent distinctive terrain features much better than those generated solely from gridded elevation measurements. A lidar point dataset combined with ancillary breaklines is also considered a DTM.

DISCRETE RETURN LIDAR	Lidar system or data in which important peaks in the waveform are captured and stored. Each peak represents a return from a different target, discernible in vertical or horizontal domains. Most modern lidar systems are capable of capturing multiple discrete returns from each emitted laser pulse.
ELEVATION	The distance measured upward along a plumb line between a point and the geoid. The elevation of a point is normally the same as its orthometric height, defined as H in the equation: $H=h-NH=h-N,$ where hh is equal to the ellipsoid height and NN is equal to the geoid height.
FIRST RETURN (FIRST-RETURN)	The first important measurable part of a return lidar pulse.
FLIGHTLINE	A single pass of the collection aircraft over the target area. Commonly used incorrectly to refer to the data resulting from a flightline of collection. *See* swath.
FUNDAMENTAL VERTICAL ACCURACY (FVA)	Replaced by the term nonvegetated vertical accuracy (NVA), in this specification, FVA is the term used by the National Digital Elevation Program (NDEP) guidelines for vertical accuracy at the 95-percent confidence level in open terrain only where errors should approximate a normal error distribution. *See* nonvegetated vertical accuracy, accuracy, confidence level.
GEOGRAPHIC INFORMATION SYSTEM (GIS)	A system of spatially referenced information, including computer programs that acquire, store, manipulate, analyze, and display spatial data.
GEOSPATIAL DATA	Information that identifies the geographic location and characteristics of natural or constructed features and boundaries of earth. This information may be derived from—among other things—remote-sensing, mapping, and surveying technologies. Geospatial data generally are considered to be synonymous with spatial data; however, the former always is associated with geographic or Cartesian coordinates linked to a horizontal or vertical datum, whereas the latter (for example, generic architectural house plans) may include dimensions and other spatial data not linked to any physical location.
GROUND TRUTH	Verification of a situation without errors introduced by sensors or human perception and judgment.

HYDROLOGICALLY FLATTENED (HYDRO-FLATTENED)	Processing of a lidar-derived surface (DEM or TIN) so that mapped waterbodies, streams, rivers, reservoirs, and other cartographically polygonal water surfaces are flat and, where appropriate, level from bank to bank. Additionally, surfaces of streams, rivers, and long reservoirs demonstrate a gradient change in elevation along their length, which is consistent with their natural behavior and the surrounding topography. In traditional maps that are compiled photogrammetrically, this process is accomplished automatically through the inclusion of measured breaklines in the DTM; however, because lidar does not inherently include breaklines, a DEM or TIN derived solely from lidar points will depict water surfaces with unsightly and unnatural artifacts of triangulation. The process of hydro-flattening typically involves the addition of breaklines along the banks of specified waterbodies, streams, rivers, and ponds. These breaklines establish elevations for the water surfaces that are consistent with the surrounding topography and produce aesthetically acceptable water surfaces in the final DEM or TIN. Unlike hydro-conditioning and hydro-enforcement, hydro-flattening is not driven by any hydrologic and hydraulic (H&H) modeling requirements but solely by cartographic mapping needs.
INTENSITY (LIDAR)	For discrete-return lidar instruments, intensity is the recorded amplitude of the reflected lidar pulse at the moment the reflection is captured as a return by the lidar instrument. Lidar intensity values can be affected by many factors such as the instantaneous setting of the instrument’s Automatic Gain Control and angle of incidence and thus cannot be equated to a true measure of energy for discrete return systems. In full-waveform systems, the entire reflection is sampled and recorded, and true energy measurements can be made for each return or overall reflection. Intensity values for discrete returns derived from a full-waveform system may or may not be calibrated to represent true energy. Lidar intensity data make it possible to map variable textures in the form of a grayscale image. Intensity return data enable automatic identification and extraction of objects such as buildings and impervious surfaces and can aid in lidar point classification. In spite of their similar appearance, lidar intensity images differ from traditional panchromatic images in several important ways:
LAS	A public file format for the interchange of 3D point cloud data between data users. The file extension is. las.
LAST RETURN	The last important measurable part of a return lidar pulse.
LEVER ARM	A relative position vector of one sensor with respect to another in a direct georeferencing system. For example, with aerial mapping cameras, lever arms are positioned between the inertial center of the Inertial Measurement Unit (IMU) and the phase center of the Global Positioning System (GPS) antenna, each with respect to the camera perspective center within the lens of the camera.

LIDAR	An instrument that measures distance to a reflecting object by emitting timed pulses of light and measuring the time difference between the emission of a laser pulse and the reception of the pulse's reflection(s). The measured time interval for each reflection is converted to distance, which when combined with position and attitude information from GPS, IMU, and the instrument itself, allows the derivation of the 3D point location of the reflecting target's location.
MASS POINT(S)	Irregularly spaced points, each with x, y, z coordinates, typically (but not always) used to form a TIN. When generated manually, mass points are ideally chosen to depict the most significant variations in the slope or aspect of TIN triangles; however, when generated automatically (for example, by lidar), mass point spacing and pattern depend upon the characteristics of the technologies used to acquire the data. Mass points are usually used in conjunction with breaklines. See breakline.
METADATA	Any information that is descriptive or supportive of a geospatial dataset, including formally structured and formatted metadata files (for example, eXtensible Markup Language [XML]-formatted Federal Geographic Data Committee [FGDC] metadata), reports (collection, processing, quality assurance/quality control [QA/QC]), and other supporting data (for example, survey points, shapefiles).
NOMINAL PULSE DENSITY (NPD)	A common measure of the density of a lidar dataset; NPD is the typical or average number of pulses within a specified areal unit. NPD is typically expressed as pulses per square meter. This value is predicted in mission planning and empirically calculated from the collected data, using only the first (or last) return points as surrogates for pulses. As used in this specification, NPD refers to single swath, single instrument data, whereas ANPD describes the overall pulse density resulting from multiple passes of the lidar instrument, or a single pass of a platform with multiple lidar instruments, over the same target area. NPD is more commonly used in high-density collections (greater than or equal to 1 pulses per square meter [pls/m2]), with its inverse, NPS, being used in low-density collections (less than or equal to 1 pls/m2). Assuming meters are being used in both expressions, NPD can be calculated from NPS using the formula NPD = 1/NPS 2.
NOMINAL PULSE SPACING (NPS)	A common measure of the density of a lidar dataset, NPS is the typical or average lateral distance between pulses in a lidar dataset, typically expressed in meters and most simply calculated as the square root of the average area per first return point. This value is predicted in mission planning and empirically calculated from the collected data, using only the first (or last) return points as surrogates for pulses. As used in this specification, NPS refers to single swath, single instrument data, whereas ANPS describes the overall pulse spacing resulting from multiple passes of the lidar instrument, or a single pass of a platform with multiple lidar instruments, over the same target area. NPS is more commonly used in low-density collections (greater than or equal to 1 m NPS), with its inverse, NPD, being used in high-density collections (less than 1 m NPS). Assuming meters are being used in both expressions, NPS can be calculated from NPD using the formula NPS = $1/\sqrt{NPD}$.

POINT CLASSIFICATION	The assignment of a target identity classification to a particular lidar point or group of points.
POINT CLOUD	One of the fundamental types of geospatial data (others being vector and raster), a point cloud is a large set of 3D points, typically from a lidar collection. As a basic geographic information system (GIS) data type, a point cloud is differentiated from a typical point dataset in several key ways:
POSTPROCESSING	In lidar, postprocessing refers to the processing steps applied to lidar data point clouds, including point classification, feature extraction (for example, building footprints, hydrographic features, and others), tiling, and generation of derivative products (DEMs, DSMs, intensity images, and others).
PRECISION	The closeness with which measurements agree with each other, even though they may all contain a systematic bias.
PREPROCESSING	In lidar, the preprocessing of data most commonly refers to those steps used in converting the collected GPS, IMU, instrument, and ranging information into an interpretable *X-Y-Z* point cloud, including generation of trajectory information, calibration of the dataset, and controlling the dataset to known ground references.
RASTER	One of the fundamental types of geospatial data (others being vector and point cloud), a raster is an array of cells (or pixels) that each contain a single piece of numeric information representative of the area covered by the cell. Raster datasets are spatially continuous; with respect to DEMs, this quality creates a surface from which information can be extracted from any location. As spatial arrays, rasters are always rectangular; cells are most often square. Co-located rasters can be stored in a single file as layers, as with color digital images. *See* raster, vector.
RESOLUTION	The smallest unit a sensor can detect or the smallest unit a raster DEM depicts. The degree of fineness to which a measurement can be made. “Resolution” is also used to describe the linear size of an image pixel or raster cell.
ROOT MEAN SQUARE DIFFERENCE (RMSD)	The square root of the average of the set of squared differences between two dataset coordinate values taken at identical locations. RMSD differentiates from root mean square error (RMSE) because neither dataset is known to be more or less accurate than the other, and the differences cannot be regarded as errors. RMSD is used in lidar when assessing relative accuracy, both intraswath and interswath. *See* root mean square error.
ROOT MEAN SQUARE ERROR (RMSE)	The square root of the average of the set of squared differences between dataset coordinate values and coordinate values from an independent source of higher accuracy for identical points. The RMSE is used to estimate the absolute accuracy of both horizontal and vertical coordinates when standard or accepted values are known, as with GPS-surveyed check points of higher accuracy than the data being tested. In the United States, the independent source of higher accuracy is expected to be at least three times more accurate than the dataset being tested.

SPATIAL DISTRIBUTION	In lidar, the regularity or consistency of the point density within the collection. The theoretical ideal spatial distribution for a lidar collection is a perfect regular lattice of points with equal spacing on x and y axes. Various factors prevent this ideal from being achieved, including the following factors:
STANDARD DEVIATION	A measure of spread or dispersion of a sample of errors around the sample mean error. It is a measure of precision, rather than accuracy; the standard deviation does not account for uncorrected systematic errors.
SWATH	The data resulting from a single flightline of collection. Swaths can be considered as one of five general types:
TOPOLOGY	The spatial relationship between geographic features in a common space. Examples particularly relevant to this specification include precise coincidence of ending and beginning vertices of lines in a continuous network (stream connectivity), and consistent line direction (from high to low) corresponding to streamflow direction.
TRIANGULATED IRREGULAR NETWORK (TIN)	A vector data structure that partitions geographic space into contiguous, nonoverlapping triangles. In lidar, the vertices of each triangle are lidar points with *x*, *y*, and *z* values. In most geographic applications, TINs are based on Delaunay triangulation algorithms in which no point in any given triangle lies within the circumcircle of any other triangle.

1 GENERAL BACKGROUND

India has a population of over 1.3 billion people spread over a vast geography. Mobility will play key role with urbanisation and the growth of cities. The transport sector is and will continue to remain a critical enabler of development and would also have to grow in a sustained manner for the country to meet its developmental objectives. Transport accounts for more than half of India's total petroleum consumption and more than 25% of the overall energy needs. It accounts for about 13% of the total GHG emissions. Given the relative advantage of the efficiency of rail-based transport, increasing the share of rail for both passenger movement (regional, suburban and urban) and freight movement is vital for increasing the energy efficiency of the transport sector thereby, reducing the GHG emissions of the country. The Transport Department of Government of Gujarat is entrusted with the responsibility of providing an efficient public transportation system, control of vehicular pollution, registration of vehicles in Gujarat, issuance of Driving licences, issuance of various permits, collection of road taxes. The department also entrusted in policy-making, co-ordination, implementation, monitoring and regulatory functions of all the Transport related aspects of Gujarat.

Rail transport is an important mode of transport in India. All main-line rail operations in India are handled by Indian Railways (IR), a state-owned organization of the Ministry of Railways. As of March 2017, the rail network comprises 121,407 km (75,439 mi) of track over a route of 67,368 km (41,861 mi) and 7,349 stations. It is the fourth-largest railway network in the world (after those of the United States, Russia and China).Forty nine percent of the routes are electrified with 25 KV AC electric traction while thirty-three percent of them are double or multi-tracked. It is one of the busiest networks in the world, transporting 8.107 billion passengers and over 1.108 billion tonnes of freight annually, as of 2017. Indian Railways is the world's eighth largest employer, with more than 1.308 million employees as of March 2018. As of March 2017, IR's rolling stock consisted of 277,987 freight wagons, 70,937 passenger coaches and 11,452 locomotives. IR owns locomotive and coach-production facilities at several locations in India. The urban rail transit systems across the country are operated independently of Indian Railways. There are currently 11 operational rapid transit (also called 'metro') systems in ten cities in India. As of September 2019, India has 638 kilometres (396 miles) of operational metro lines and 502 stations. A further 500+ km of lines is under construction and 1200+ km of lines is proposed.

Southern Railway’s present network extends over a large area of India’s Southern Peninsula, covering the states of Tamil Nadu, Kerala, Pondicherry and a small portion of Andhra Pradesh. Serving these naturally plentiful and culturally rich southern states, the Southern Railway extends from Mangalore on the west coast and Kanniyakumari in the south to Renigunta in the North West and Gudur in the North East. The Indian Railways' Southern Railway line runs through the state of Kerala, connecting most major towns and cities except those in the highland districts of Idukki and Wayanad. The railway network in the state is controlled by two out of six divisions of the Southern Railway: Thiruvananthapuram Railway division and Palakkad Railway Division. Tirur Railway Station is Oldest Railway Station in Kerala and Shornur Junction (SRR) is the largest railway station in the state.

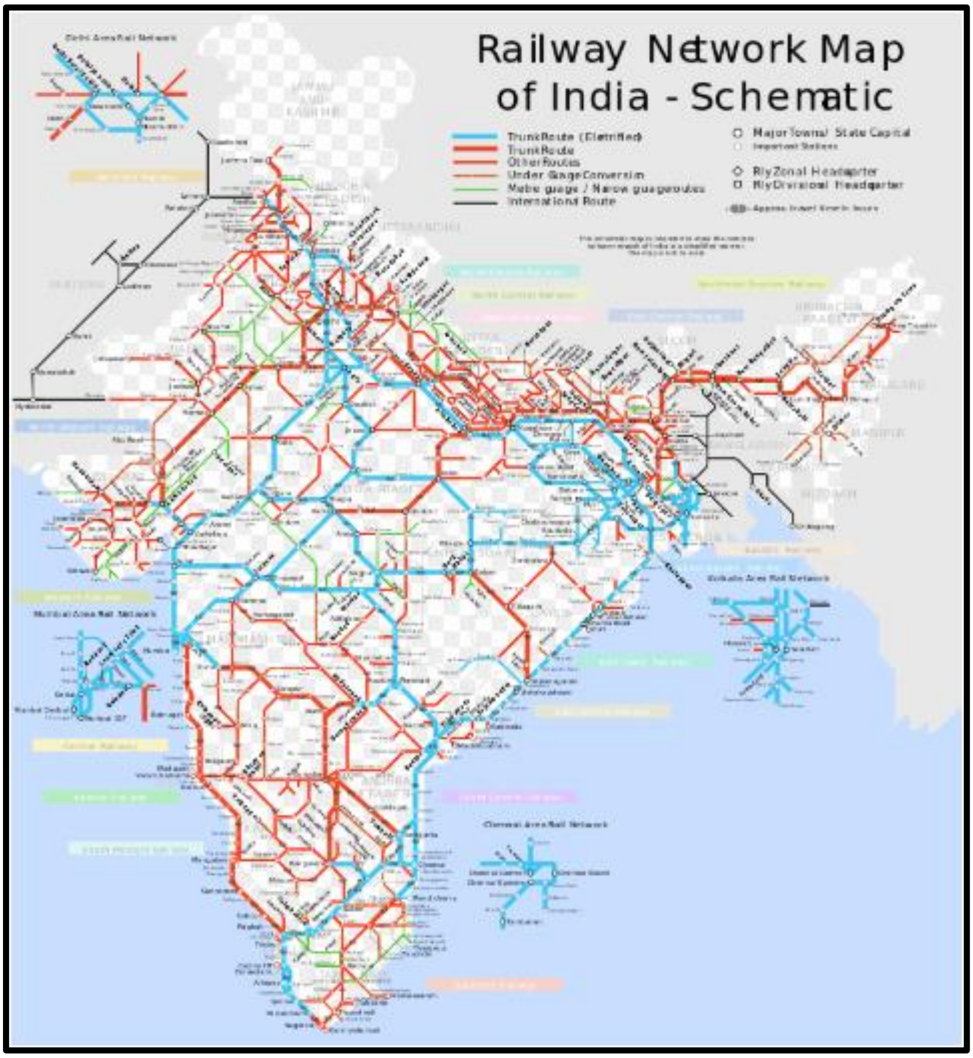

Railway Network Map of India - Schematic
Trunk Route (Electrified)
Trunk Route
Other Routes
Under Gauge Conversion
Metre gauge / Narrow gauge routes
International Route
Major Towns/ State Capital
Important Stations
Rly Zonal Headquarter
Rly Divisional Headquarter
Delhi Area Rail Network
Mumbai Area Rail Network
Kolkata Area Rail Network
Chennai Area Rail Network

Figure 1: Railway Network Map of India

2 PROJECT DESCRIPTION

Indian Railways aims to increase the speed of passenger trains to 160–200 km/h (99–124 mph) on dedicated conventional tracks. They intend to improve their existing conventional lines to handle speeds of up to 160 km/h (99 mph), with a goal of speed more than 200 km/h (120 mph) on new tracks with improved technology. Initially, the trains will have the maximum speed of 160 km/h (99 mph), with railway coaches which can run at the speed of 200 km/h (120 mph) will be rolled out from Railway Coach Factory of Indian Railway from June 2015. Indian Railway coach factories are manufacturing semi-high speed coaches, but tracks are not capable of supporting the same. Dedicated Freight Corridors coming up across India will move cargo traffic from most of the current passenger railway tracks and will support Indian Railways effort to increase the speed of the passenger trains to 200 km/h.

The Thiruvananthapuram–Kasaragod Semi High Speed Rail Corridor is a proposed railway corridor that would connect Kerala, Thiruvananthapuram with Kasaragod in Kerala. The Detailed Project Report of the project is being prepared by K-Rail (Kerala Rail Development Corporation Limited), a joint Venture Company between Ministry Of Railways and Government of Kerala. The 532 km SHSR corridor named Silver

Line connecting Kasaragod and Thiruvananthapuram eases the transport between north and south ends of the state and reduces the total travel time to less than 4 hours, compared with the present 10 to 12 hrs. The proposed rail lines is designed to run at a Semi-High Speed of 200 km/h. Kochuveli, Kollam, Chengannur, Kottayam, Info park, Kochi , Cochin Airport, Thrissur, Malappuram, Kozhikode, Kannur and Kasaragod will be the stations in this corridor.

Kerala has 1.62 lakh kilometres of roads which is 4.2% of India's total length. It is quite high considering that Kerala accounts for 2.7% of the total population of India. The existing railway network in the state is also not suitable for faster travel. The average speed of journey by rail and road in the state is about 30% to 40% lower than in the neighbouring states. The journey becomes even slower in the rainy seasons because of deterioration in the condition of the roads and railway lines. Because of the adverse terrain, there is little scope of economically raising speed of trains on the existing railway line in the corridor. With the above in mind, the Government has decided to build the Thiruvananthapuram - Kasaragod corridor as a Semi high-speed line, covering the coastal region which is the most densely populated region of the state.

Kerala being a densely populated state, most of the commuters depend on the conventional modes of transport. The proposed Silver Line (SHSR) will bring about a remarkable change in local commute, by improving the travel time and quality of transportation. There will be a substantial reduction in road accidents due to the reduction of congestion on roads. This also includes the last mile connectivity using aggregate services and feeder services, which will transform the people's perception towards public transportation. The Silver Line (previously called as SHSR) will also be duly integrated with the existing Indian Railway network for the benefit of interstate and long distance travellers.

Transport systems bring enormous benefits to society providing access and mobility that are essential for modern societies and economic growth. However, transport activities have many undesirable external impacts as well, such as CO2 emissions, congestion, accidents, land use and many more. The urge to fight these challenges is therefore pushing economies towards more efficient, and sustainable solutions. Silver Line is a suitable alternative as it saves time, resources, and helps in reduction of carbon footprint by relying on renewable energy sources for its stations, providing last-mile connectivity to and from the station using electric vehicles (EVs), and facilities for parking/charging EVs at the stations. The proposed RORO services also contributes in reducing pollution and congestion compared to road transport of goods vehicles.

In August 2016, the KHSRCL announced that it would conduct survey to determine public opinion of the proposed alignment. The survey is intended to prevent any possible protests over land acquisition and suppress dissent from opponents of development projects in the state. The results of the survey, published in February 2017, found that 86% of the 13,447 people interviewed across 110 assembly constituencies in 11 districts were in favour of the project. Only 9% of those surveyed opposed the project, while 5% remained neutral. 73% of the respondents were aware of the project before being interviewed. Of those who had not heard of the project, 82% expressed support, while 88% of those who were aware expressed support. Supporters of the project believe that it will reduce travel time, reduce greenhouse gas emissions and accidents, and generate development in the state. Opponents of the project argue that the project will result in large-scale displacement of people as a result of land acquisition, take away the livelihood of farmers whose land is acquired, waste a large sum of money, and reduce the number of trees.

In 2019, a survey by French consultant company Systra found that the Kochuveli-Kasaragod rail corridor could be financially viable. Systra found that the project can recoup 6% of its cost every year after linking Thiruvananthapuram and Kochi airports.[26] The state agency, Kerala State Remote Sensing and Environment Centre (KSERC), is supposed to submit the survey report by March 2020. After land acquisition order, a detailed project report (DPR) will be prepared by the Government of Kerala.

Kerala will get a special railway corridor along its 532-km length by 2024, as the state government is set to build a Rs 66,079-crore rail line that will enable semi-high speed trains ply between upstate Kasaragod and the capital city of Thiruvananthapuram. The 532-kilometre-long semi high-speed corridor from Thiruvananthapuram to Kasaragod would not have any level crossings. K-Rail will have to acquire about 1,200 hectares for the project that will have the rails elevated along urban stretches. The trains will run at a maximum speed of 200 km per hour. They will initially have nine coaches, and the number will be subsequently enhanced to 12. The travel charge is projected to be Rs 2.75 per km, and there will be an annual hike of 7.5 per cent.

K-Rail expects a ridership of 67,740 passengers a day. It estimates to carry 1,330 travellers in one direction at peak hours. For meeting the expenses of the Rs 66,079-crore project, Rs 34,454 crore will come as loans. The Centre and state will need to provide Rs 7,720 crore each. The Kerala government will spend Rs 8,656 crore on land acquisition and allied matters. The rest of the expenses will be met through other loans by the union and state governments. The rail line will pass through eleven of the state's 14 districts, and will stop at 10 stations. Up its northward course from Thiruvananthapuram, these stations will be Kollam, Chengannur, Kottayam, Ernakulum, Kochi Airport, Thrissur, Tirur, Kozhikode and Kannur before reaching Kasaragod. The Silver Line corridor will be 100% green project. K-Rail is set to adopt last-mile connectivity, with multi-modal integration, system-driven e-vehicle public transport system, charging as well as parking stations, which would take the state to next generation of urban mobility. The project will also adopt the latest world-class rail system technology like signalling system of ERTMS level-2 with automatic train control system, ticketing, communication, fully air-conditioned rolling stock with modern passenger amenities. The main depot for the line will be located near the Kochuveli terminus.

3 PROJECT AREA

Kerala is a state on the south-western Malabar Coast of India. Spread over **38,863 km2 (15,005 sq. mi)**, Kerala is the twenty-third largest Indian state by area. It is bordered by Karnataka to the north and northeast, Tamil Nadu to the east and south, and the Lakshadweep Sea to the west. With 33,387,677 inhabitants as per the 2011 Census, Kerala is the thirteenth-largest Indian state by population. It is divided into 14 districts with the capital being Thiruvananthapuram. Malayalam is the most widely spoken language and is also the official language of the state. The state has the highest media exposure in India with newspapers publishing in nine languages, mainly English and Malayalam. Kerala is one of the prominent tourist destinations of India, with backwaters, hill stations, beaches, Ayurvedic tourism and tropical greenery as its major attractions.

Southern Railway zone of Indian Railways operates all railway lines in the state connecting most major towns and cities. The railway network in the state is controlled by two out of six divisions of the Southern Railway; Thiruvananthapuram Railway division and Palakkad Railway Division. Thiruvananthapuram Central (TVC) is the busiest railway station in the state.

The existing railway network and highways in the state are not amenable to faster travel. Average speed on the roads and trains is among the lowest of all regions in the country. Due to excessive number of level crossings and sharp curves, the fastest train takes about 12 hours for traversing a total length of 560kms with an average speed of 45km/hr. The train traffic in the existing double line between Thiruvananthapuram and Kasaragod has increased manifold and some of the sections have capacity utilization of more than 115%. With the above in mind, the Government has decided to build a Semi High-Speed Rail (Silver Line) corridor.

This Semi-High-Speed Rail Project, will connect the North and South regions of the State with train services that will operate at a maximum speed of 200 km/hour, reducing the total travel time to less than 4 hours. Silver Line will redefine intra-state travel in Kerala with its high quality, time-saving services and provide efficient last mile connectivity through aggregate and feeder services. This will ensure maximum passenger convenience and encourage more and more people to use public transport. Silver Line is expected to bring about host of positive changes to the way people in Kerala travel by creating a fast, efficient and reliable mode of long-distance transport, which will decongest roads, reduce accidents, minimize air pollution and most importantly, ease the current rail passenger rush.

Silver Line will bring remarkable changes in local commute, by improving the travel time and quality of transportation. Every kilometre travelled by a person on semi high-speed rail is a kilometre not travelled in an automobile. There will be a substantial reduction in road accident due to decongestion on roads. Silver Line also provides last mile connectivity using aggregate services and feeder services, which will transform people's perception towards public transportation. The alignment fixed has been proposed through thinly populated areas to lessen displacement of people. In cities, the option of elevated lines has been mooted. Alignment has been proposed for laying railway line to the premier airport of the State and to Cochin International Airport.

Aerial LiDAR Survey complemented with Aerial Photography carried out for the proposed Area of Interest as given by KRDCL for the Semi High-Speed corridor from Trivandrum to Kasaragod of length 532 Km. The alignment of the Semi HSR passes through Kollam, Chengannur, Kottayam, Cochin, Thrissur, Malappuram, Kozhikode, Kannur and Kasaragod in Kerala. The google earth view of the project corridor is shown below;

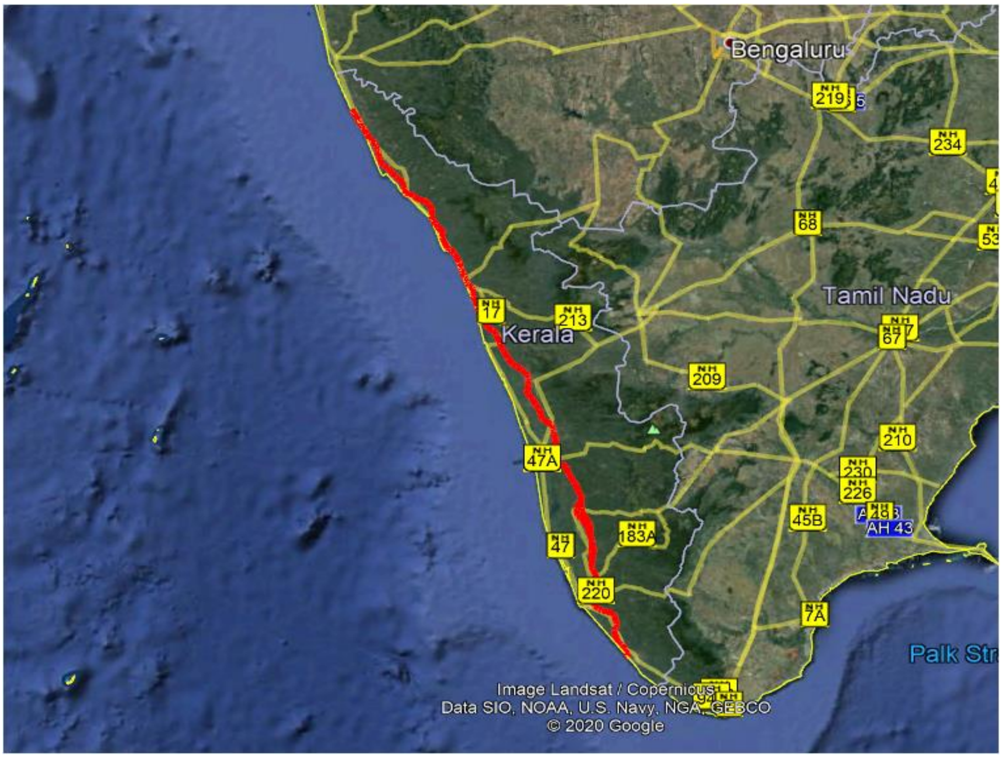


Figure 2: Project Area of Interest

4 REVIEW OF TECHNOLOGY

The surveying industry has seen many changes in the past decade. Recently, Topographical surveying has seen great evolution with highly engineered instruments which can collect and process large quantities of data in a very short time (e.g.: satellite imagery, UAV based surveys, aerial photogrammetry and LiDAR). The following are the details of these technologies:

Manual Survey: In this process instruments such as 'Total Station' (Evolved from Theodolite), 'Auto Level (or 'Dumpy Level)' and Stand-alone GPS devices are used. In this process only one point (x,y,z) can be taken at a time and it is hence very labour intensive. In India, this is the dominant form of surveying.

Figure 3: Surveyor using Auto Level

Taking an example of a typical road and drainage network survey, a section of 100 KM will take up to 2 months of surveying and this will end in giving discrete points at an interval of 50 m (or as defined by scope). Hence, the resultant topographical model is not continuous and points in between are extrapolated. As the skill levels of surveyors are very low, the resultant data is highly error prone and oversight is required for every work. Surveys of very large areas like 'Irrigation survey', 'City drainage network survey 'and 'City Survey' take a very long time. For difficult terrains like Hydro power plants, such surveys are practically impossible to do (eg: a senior Central Water Commission officer reported about a Hydro project delayed for more than 8 years for want of good quality survey data).

Satellite Imagery: Satellite imagery consists of photographs of Earth or other planets made by means of artificial satellites revolving around the earth. Some of these satellites are owned by private agencies such as Geo-Eye or Digital Globe which sell satellite imagery for public use. Since the photographs are taken from space, the resolution is usually poorer but it still suffices many purposes such as meteorology, forestry, regional planning etc. While the photographs are taken in 2D, using stereo imagery depth perception is created (similar to the manner in which human eyes perceives depth using 2 eyes). This imagery is good for overall planning but may need to be supplemented by Aerial photography or LiDAR data for better accuracy. Google Earth is a prime example of use of satellite imagery for public use.

Figure 4: Satellite Imagery

Aerial Photography: Aerial photography is the taking of photographs of the ground from an elevated position. Platforms for aerial photography include fixed-wing aircraft, helicopters, Unmanned Aircraft Vehicle (UAV), balloons and blimps. Aerial photography and panoramic photography were used for civilian mapping, topography and cartography by the US Geological Survey in Alaska before World War I.

Accuracy of up to 30 cm can be achieved (eg: Ordnance Survey of UK is taking pictures using 96 megapixel cameras). Again depth perception is achieved by using stereo imagery. This accuracy is good enough for mapping products focusing on 'Point of Interest features (shops etc.)' like Google Maps, Bing Maps and Apple Maps. In fact, these organizations have huge mapping programs for collecting such mapping information on continuous basis.

Figure 5: Aerial Photograph

Within aerial photography the different types of systems are:

- ✓ **Ortho photographs:** taken by camera facing straight down (also called as Ortho Imagery)
- ✓ **Oblique photographs:** Photographs taken at an angle are called oblique photographs. These photographs give a more realistic feel of data as even the sides of the buildings are clearly visible.
- ✓ **Combination Photographs:** Usually, the recent flying programs include a combination of Oblique and vertical imagery

LiDAR: LiDAR implies Light Detection and Radiation. In LiDAR a Laser is used to throw a light pulse and a sensor is employed to detect the return of the pulse. The 'Time of flight' is then calculated and since the speed of light is a constant the distance of the point can be calculated.

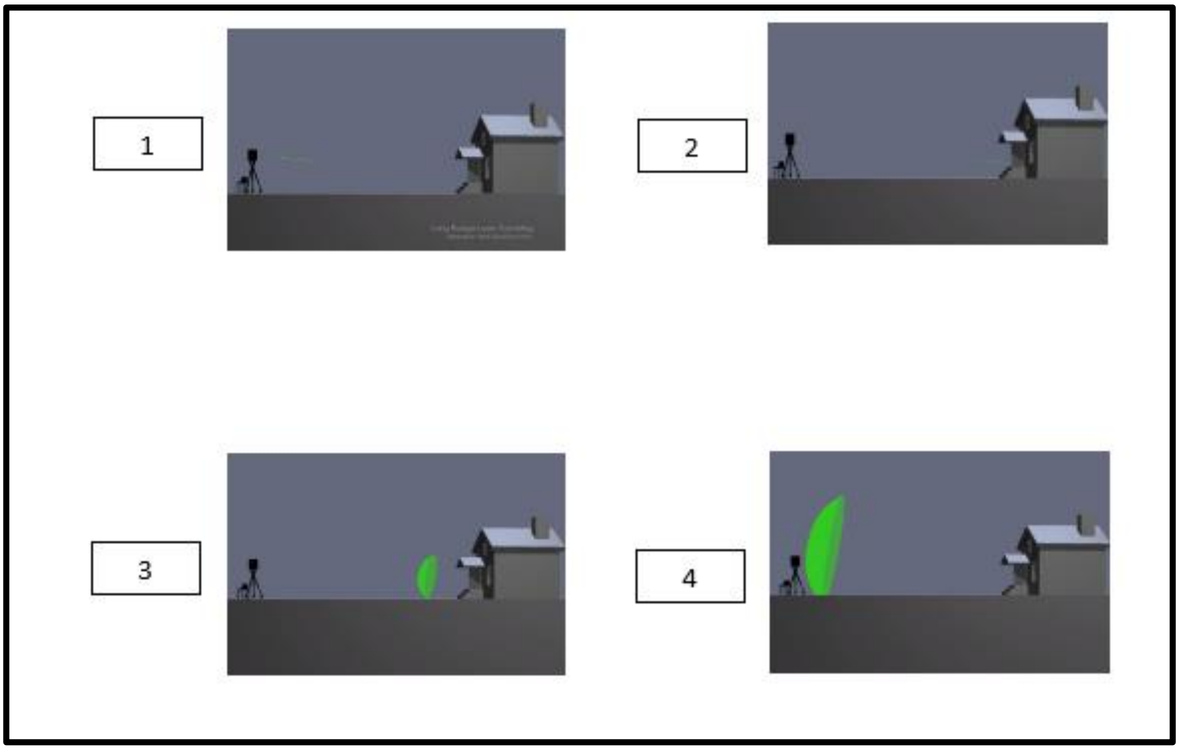
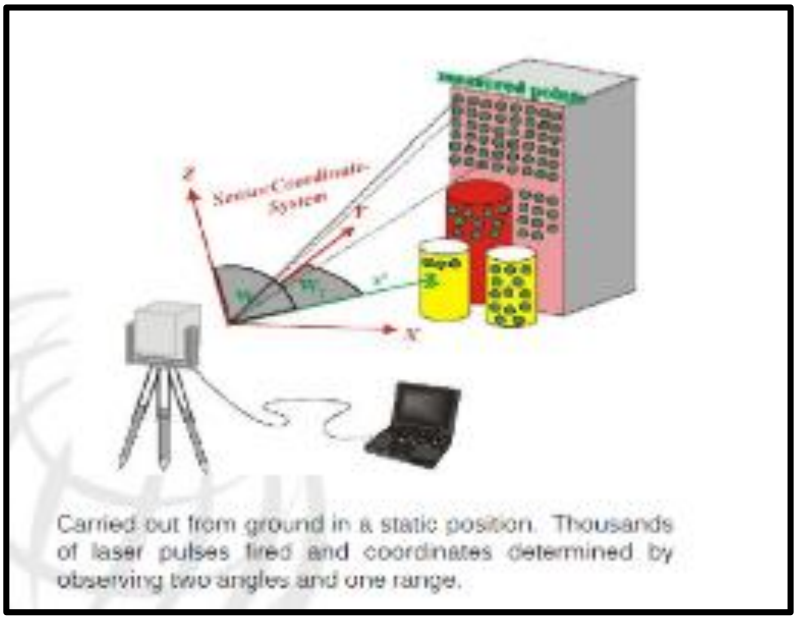


Figure 6: Principle of LiDAR

LiDAR has an advantage over photography in that the data set generated is in 3D only unlike in photographs where 2D photographs have to be converted into 3D by combining 2 stereo images (this process is called as raster to vector conversion). LiDAR can also give more accurate results with results up to millimeter accuracy. Hence, LiDAR can be used for all survey purposes including engineering design (which requires the highest level accuracy). LiDAR in turn is used through 3 different modes. These are:

Terrestrial LiDAR: Carried out from ground in a static position. A 360-degree model is created from each place the equipment is kept. These images can be stitched together to create a topographic map. Accuracy is sub 10 mm. Useful for Building Survey, Small mines survey or small area survey (Less than 20 Sq. KM)



Carried out from ground in a static position. Thousands of laser pulses fired and coordinates determined by observing two angles and one range.

Figure 7: Terrestrial LiDAR Scanner

Mobile LiDAR: In this form a combination of equipment is used. These are: a) LiDAR equipment, b) GPS unit for positional accuracy, c) Inertial Measurement Unit (IMU) for orientation accuracy and d) cameras for recording images (for colouring the output). Mobile LiDAR is useful for surveying linear areas where road mobility is available. Such areas are – Highways, Cities etc.

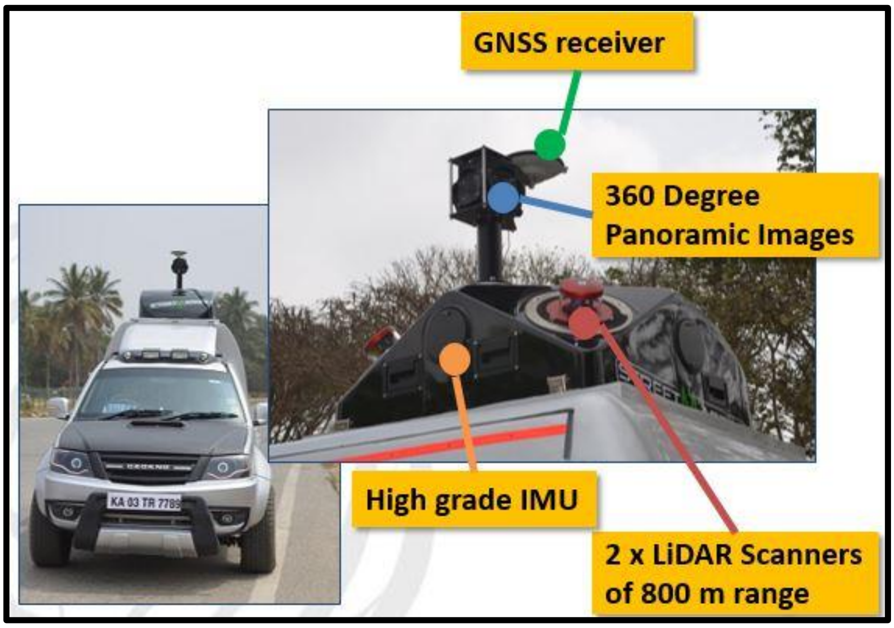

GNSS receiver
360 Degree Panoramic Images
High grade IMU
2 x LiDAR Scanners of 800 m range
KA 03 TR 7789

Figure 8: Mobile LiDAR Scanner

Aerial LiDAR: This is similar to mobile LiDAR except that the unit is mounted on an aircraft. This is useful for large area survey such as Railway alignments, Urban utilities mapping, flood mapping and city mapping etc.

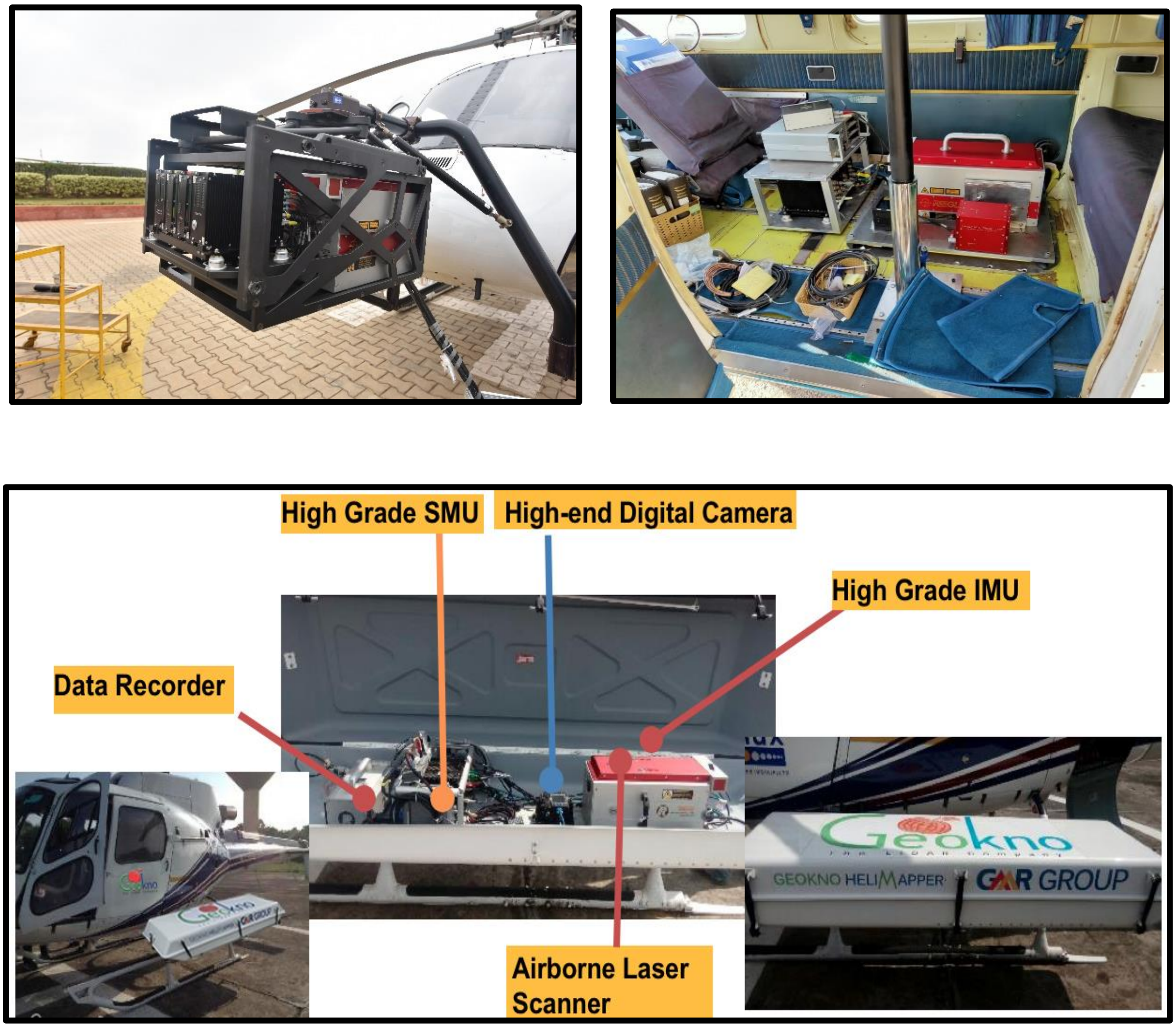


Figure 9: Aerial LiDAR Scanner fitted in various aircrafts

5 PRINCIPLE OF AERIAL LIDAR TECHNOLOGY

Aerial LiDAR System can be configured in variety of ways. A precise time stamp is used to synchronize the measurements from all system components to a common time reference frame. Laser Scanners fire pulses or emit continuous waves at fixed angular increments to determine the range to objects.

Hence, native scan data consist of angles and ranges with timestamps. The LiDAR sensor also provides an intensity (return signal strength), which is an indication of target reflectivity and can be used to distinguish objects in the point cloud.

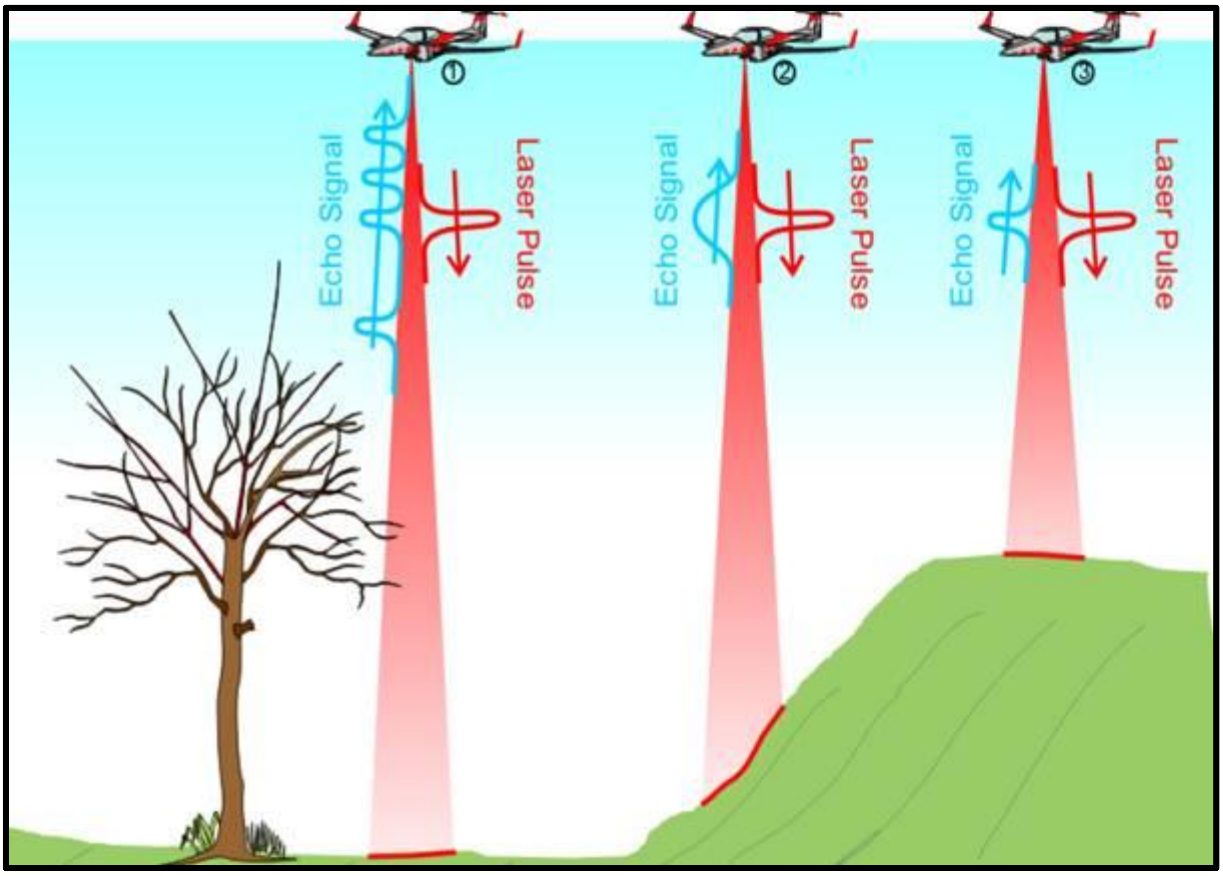


Figure 10: Principle of Aerial LiDAR Survey

The Aerial LiDAR System consist of multiple sub sensors,

AERIAL CAMERA

Pints collected by the laser scanner are generally converted to coordinates (X, Y and Z) and usually contain a LiDAR intensity measure. To aid in visualization aerial cameras can be incorporated into the ALS so that each individually scanned point can be coloured by a red, green, blue (RGB) value depicting that colour in the real world. The aerial images can also be used to generate Ortho-photos.

GNSS

GNSS receivers provide three primary observations to the ALS: time, position and velocity (speed and direction) measurements. Position and velocity information is provided to the logging computer and also to the Inertial Measurement Unit (IMU). An accurate GNSS receiver is vital to precisely geo-reference LiDAR point cloud and aerial image.

IMU

The IMU performs two key functions: first, it provides orientation and attitude information (roll, pitch and heading), and second, it assists in position estimation, particularly when GNSS quality degrades.

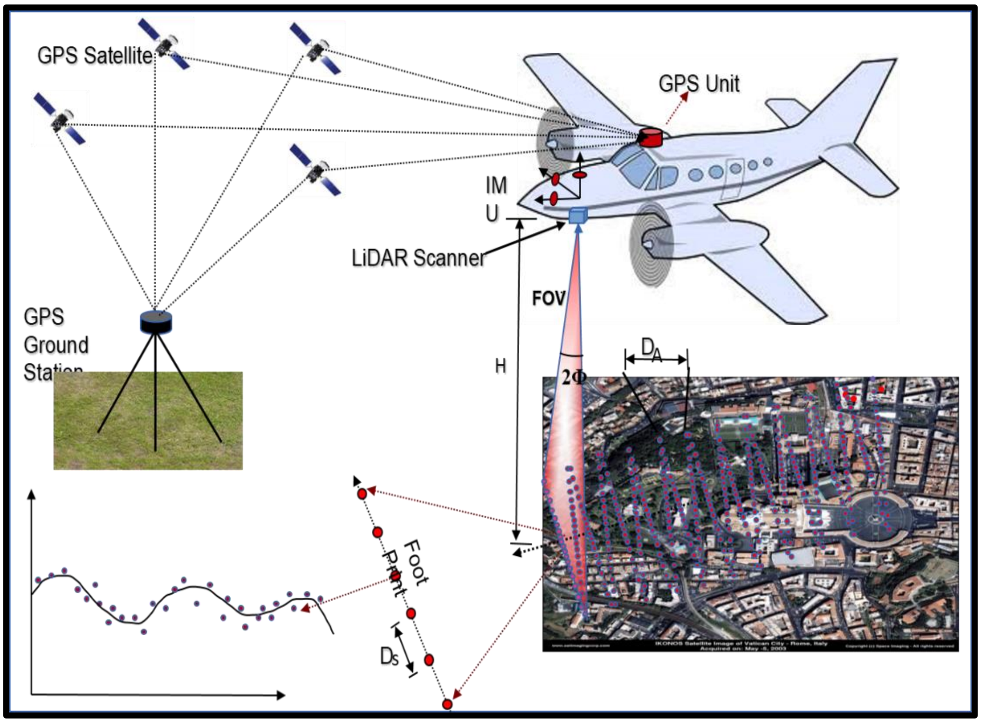


Figure 11: Components of Aerial LiDAR System

6 EXECUTIVE SUMMARY

Geokno India Private Limited has been a one of the global leading service providers on LiDAR survey and Engineering services. Kerala Rail Development Corporation Limited selected the M/s Geokno India Private Limited through open tender process to carry out the work of **"Aerial LiDAR Survey for Thiruvananthapuram – Kasaragod Semi-High-Speed Rail Corridor".**

The LiDAR Project Report includes detailed explanation on the processing and qualitative assessment performed on the data. The quantitative analysis and the accuracy results are clearly demonstrated and information on all survey points used for the accuracy analysis are included. Break line production procedures including the production methodology, qualitative assessment and topology rules used for the project are clearly explained. A data dictionary defining the horizontal and vertical datum, coordinate system and projection used for this project and all break line feature definitions for streams and rivers, and inland lakes and ponds are clearly defined. The DEM production methodology and QA/QC assessment on the DEMs are clearly explained. The LiDAR Project Report serves as the master report for the entire project.

The Aerial LiDAR Survey for the project were accomplished with Pinnacle P68 Observer-2 aircraft with registration number VT-TAA. This aircraft has rotary wing platform which is suitable for the locations which have restriction on air space. The biggest advantage of this platform is that, the aircraft can easily take off and land vertically without the need of runway. This platform can maintain relatively slow speeds and low altitudes which can prove ideal for collection of a high point density and image resolution. The entire flight operations are carried out from **Kannur International Airport** and **Trivandrum International Airport, Kerala**. The Aerial Survey utilized the RIEGL LMS-Q780 sensor with Multiple Time Around technology as the optimum solution which meets requirements for this project. The systems can collect high laser Pulse Repetition Rate (PRR) up to 400 kHz with full waveform analysis for unlimited number of target echoes.

To carry out the aerial survey, necessary clearances from Director General of Civil Aviation (DGCA), Ministry of Defence (MoD), Government of India, and other agencies as may be required were obtained. The MoD joint inspection to examine the aerial LiDAR system and aircraft was conducted in IGI airport on 20th December 2019. Aerial LiDAR survey data capture for KRDCL alignment commenced from Kannur International Airport on 31st December 2019 and was completed on 5th January 2020 at Thiruvananthapuram International Airport. Flying was carried out for 6 flying days, covering 6 sessions with nearly 29 flying hours at an altitude of 1000ft AGL.

Before carrying out the processing of the Aerial LiDAR data, it has to be security vetted by **Survey of India (SoI), Delhi.** The task number, which is a pre-requisite for security vetting has been acquired on **26th November 2019** with task number **T-1788/51-E(SV)** from SoI. Further SoI intimated to carry out Pre-Processing of Aerial LiDAR data at SoI on **27th January 2020.** The Pre-Processing has been successfully completed at SoI, office. Finally, the security vetting/clearance of the Aerial LiDAR data completed on 04th February 2020. The clearance letter received from Survey of India (SoI), Delhi on **11th May 2020.**

6.1 THE PROJECT TEAM

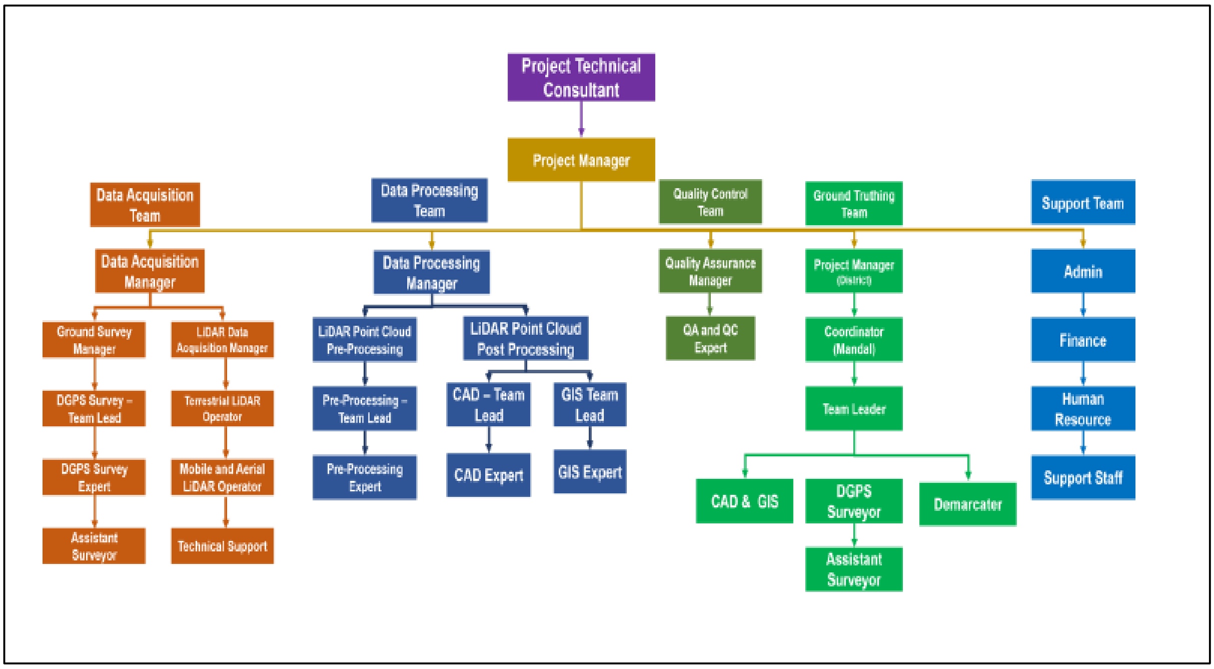


Figure 12: Project Team Chart

6.2 DATE OF LIDAR SURVEY

The details of the date of LiDAR Survey have been tabulated below

Data Acquisition Abstract	
DATE OF SURVEY	31/12/2019
MISSION NO	FLT-01, FLT-02
AIRCRAFT REG. No	VT – TAA
OPERATING BASE	Kannur International Airport
PILOT/CO-PILOT	Capt. Taxali/ Capt. Ashwani
ON BOARD LiDAR ENGINEER	Er. Sathish Sekeran
ON BOARD SECURITY OFFICER	Mr. Prashanth
AIRBORNE DURATION	4 Hours 31 Minutes
TOTAL LENGTH TO BE SURVEYED	2218 Km
LENGTH SURVEYED	400 Km
CHAINAGE COVERED	533+645 Km to 446+000 Km
GNSS GROUND BASE STATIONS	KRDCL-104-SCP & KRDCL-92-SCP

Table 1: Data Acquisition abstract - 31/12/2019

Data Acquisition Abstract	
DATE OF SURVEY	01/01/2020
MISSION NO	FLT-03, FLT-04,FLT-05
AIRCRAFT REG. No	VT – TAA
OPERATING BASE	Kannur International Airport
PILOT/CO-PILOT	Capt. Taxali/ Capt. Ashwani
ON BOARD LiDAR ENGINEER	Er. Sathish Sekeran
ON BOARD SECURITY OFFICER	Mr. Dhanesh Aravind
AIRBORNE DURATION	3 Hours 54 Minutes
TOTAL LENGTH TO BE SURVEYED	2218 Km
LENGTH SURVEYED	313 Km
CHAINAGE COVERED	446+000 Km to 370+000 Km
GNSS GROUND BASE STATIONS	KRDCL-092-SCP & KRDCL-081-SCP & KRDCL-070-SCP

Table 2: Data Acquisition abstract - 01/01/2020

Data Acquisition Abstract	
DATE OF SURVEY	02/01/2020
MISSION NO	FLT-06, FLT-07
AIRCRAFT REG. No	VT – TAA
OPERATING BASE	Kannur International Airport
PILOT/CO-PILOT	Capt. Taxali/ Capt. Ashwani
ON BOARD LiDAR ENGINEER	Er. Sathish Sekeran
ON BOARD SECURITY OFFICER	Mr. C.C Joy
AIRBORNE DURATION	4 Hours 42Minutes
TOTAL LENGTH TO BE SURVEYED	2390 Km
LENGTH SURVEYED	365 Km
CHAINAGE COVERED	370+000 Km to 262+000 Km
GNSS GROUND BASE STATIONS	KRDCL-092-SCP & KRDCL-060-SCP & KRDCL-070-SCP

Table 3: Data Acquisition abstract - 02/01/2020

Data Acquisition Abstract	
DATE OF SURVEY	03/01/2020
MISSION NO	FLT-08, FLT-09
AIRCRAFT REG. No	VT – TAA
OPERATING BASE	Kannur International Airport & Trivandrum International Airport
PILOT/CO-PILOT	Capt. Taxali/ Capt. Ashwani
ON BOARD LiDAR ENGINEER	Er. Sathish Sekeran
ON BOARD SECURITY OFFICER	Mr. Dhanesh Aravind
AIRBORNE DURATION	5 Hours 39 Minutes
TOTAL LENGTH TO BE SURVEYED	2390 Km
LENGTH SURVEYED	381 Km
CHAINAGE COVERED	262+000 Km to 180+000
GNSS GROUND BASE STATIONS	KRDCL-050-SCP & KRDCL-038-SCP & KRDCL-027-SCP

Table 4: Data Acquisition abstract - 03/01/2020

Data Acquisition Abstract	
DATE OF SURVEY	04/01/2020
MISSION NO	FLT-10, FLT-11, FLT-12
AIRCRAFT REG. No	VT – TAA
OPERATING BASE	Trivandrum International Airport
PILOT/CO-PILOT	Capt. Taxali/ Capt. Ashwani
ON BOARD LiDAR ENGINEER	Er. Sathish Sekeran
ON BOARD SECURITY OFFICER	Mr. Y. Srinivasulu Reddy
AIRBORNE DURATION	5 Hours 34 Minutes
TOTAL LENGTH TO BE SURVEYED	2390 Km
LENGTH SURVEYED	489 Km
CHAINAGE COVERED	180+000 to 107+000
GNSS GROUND BASE STATIONS	KRDCL-017-SCP & KRDCL-038-SCP & KRDCL-027-SCP

Table 5: Data Acquisition abstract - 04/01/2020

Data Acquisition Abstract	
DATE OF SURVEY	05/01/2020
MISSION NO	FLT-13, FLT-14, FLT-15
AIRCRAFT REG. No	VT – TAA
OPERATING BASE	Trivandrum International Airport
PILOT/CO-PILOT	Capt. Taxali/ Capt. Ashwani
ON BOARD LiDAR ENGINEER	Er. Sathish Sekeran
ON BOARD SECURITY OFFICER	Mr. V. Ajith Kumar
AIRBORNE DURATION	4 Hours 39 Minutes
TOTAL LENGTH TO BE SURVEYED	2390 Km
LENGTH SURVEYED	442 Km
CHAINAGE COVERED	107+000 to 0+000
GNSS GROUND BASE STATIONS	KRDCL-027-SCP & KRDCL-017-SCP & KRDCL-03-SCP

Table 6: Data Acquisition abstract - 05/01/2020

6.3 DATUM REFERENCE

Data produced for the project delivered in the following reference system;

HORIZONTAL DATUM	The World Geodetic Datum 84 (WGS-84)
VERTICAL DATUM	Survey of India Vertical Datum MSL
MAP PROJECTION	UTM Zone 43 N
UNITS	Meters
GEOID MODEL	EGM 2008

Table 7: Datum Reference

6.4 LiDAR VERTICAL ACCURACY

For this Project, the tested RMSEz for checkpoints equaled **+/- 10 cm, 95% confidence interval (1.96 X RMSE)**; and the FVA computed using RMSEz x 1.9600 was equal to **0.089 m**.

6.5 PROJECT DELIVERABLES

The following are the final project deliverables:

a. One set of unclassified LAS files- for specifications refer **Annex-BB.**

b. One set of classified LAS files in accordance with the tiling schema (to be decided in consultation with KRDCL)-for specifications refer Annex-BB.

c. One set of raster DEM's(hydroflattened bare earth) delivered in the specified grid format (for e.g., Geotiff). The DEM's must also be delivered in the project tiling and required naming schema.

d. One set of 1-meter intensity imagery in Geotiff file format.

e. One set of Metadata for each data deliverable.

f. Digital Orthophotos of 10cm GSD resolution (in tiles and seamlessly mosaicked over the AOI) in Geotiff format as per detailed specification mentioned in **Annex-CC.**

g. Three dimensional topographic survey drawing including contours (0.5m interval) of AOI, on a scale of 1: 2,500, as per detailed Specification mentioned in **Annex-DD.** A sample drawing shall be got approved from Engineer in charge before taking up drawing preparation for AoI.

h. DSM/DEM as per detailed specifications mentioned in **Annex-EE.**

i. Breaklines in dwg format as per specifications mentioned in Annex-**FF.**

j. Longitudinal and Cross Sections at 20 m interval dwg/xls format as per sample profile (are decided during project execution).

k. **Collection Report: A** collection report detailing mission planning and flight logs are submitted.

l. **Survey Report**: A survey report detailing the collection of all ground control, HFL including the following are submitted:

- Control points used to calibrate and process the LiDAR and derivative data
- Check points used to validate the LiDAR point data or any derivative product

m. **Processing Report: A** processing report detailing calibration, classification and product generation procedures including methodology used for break line collection and hydro-flattening are submitted.

n. **QA/QC Report: A** QA/QC report, detailing procedures for analysis, accuracy assessment and validation of the following are submitted.

- Point data (Absolute vertical accuracy/relative vertical accuracy)
- Bare earth surface (absolute vertical accuracy)

o. **LIDAR Project Report:**

6.6 PROJECT TILING FOOTPRINT

Totally 1095 No's of tiling footprint are generated for the project with an extent of 1000 meter x 1000 meter.

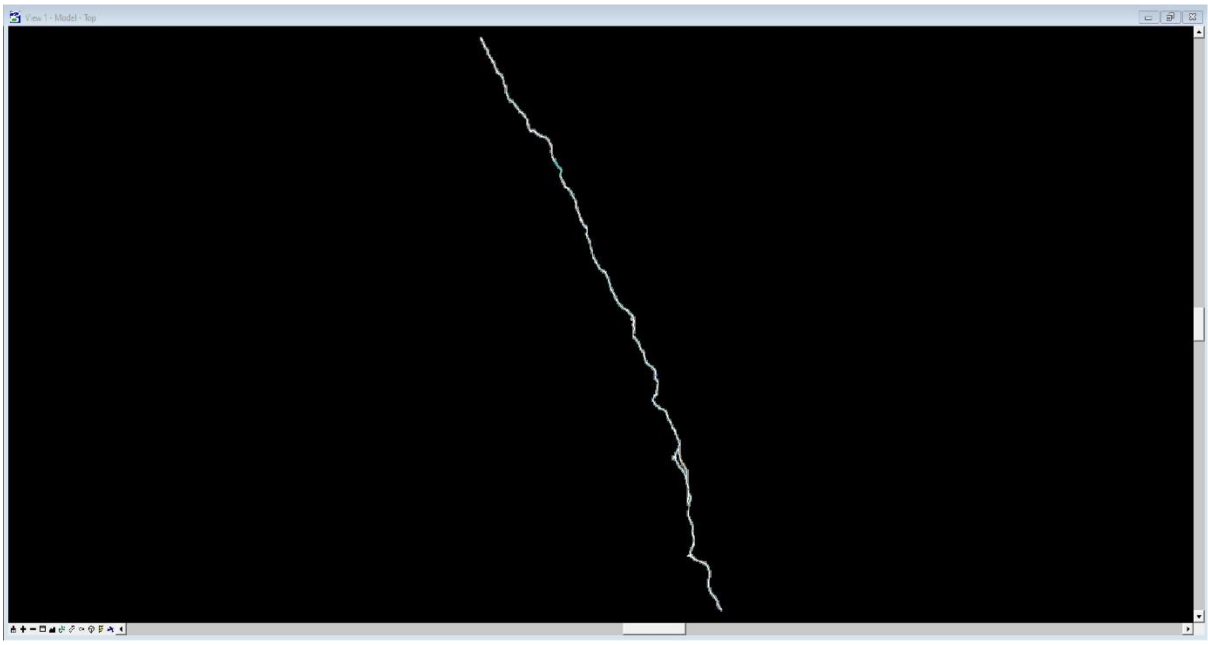


Figure 13: Tile Footprint generated for project area

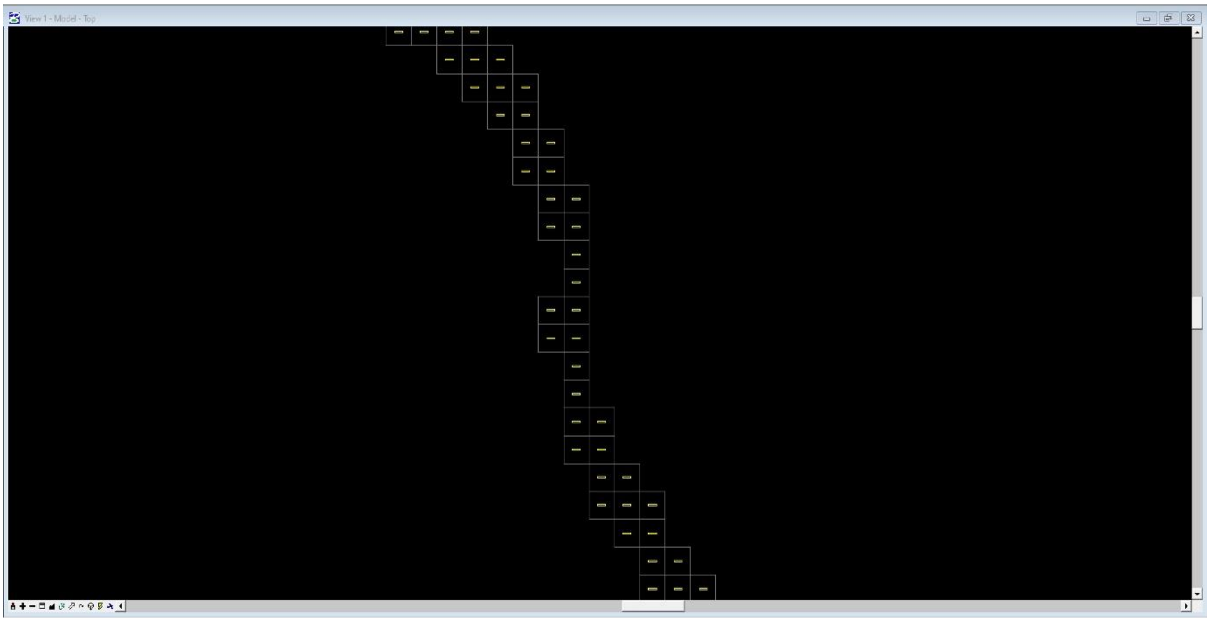


Figure 14: Tiles-footprint Zoom in View

7 LIDAR ACQUISITION REPORT

7.1 LiDAR ACQUISITION DETAILS

The Tables below show the specifications that were required on the Aerial LiDAR data collections.

7.1.1 AERIAL LIDAR SPECIFICATIONS

PARAMETERS	RFP SPECIFICATIONS
Data Density	10 points/m^2
Fundamental spatial Accuracy Requirement	Fundamental Vertical Accuracy (FVA) <= +/- 10 cm. 95% confidence level Fundamental Horizontal Accuracy (FHA) <= +/- 15 cm. 95% confidence level
Horizontal Datum	WGS-84

Vertical Datum	Orthometric: All Deliverables are in SOI Vertical Datum (MSL). Ellipsoid: All Deliverables are in terms of WGS- 84
Map projection	Universal Traverse Mercator (UTM)
Geoid Model	EGM 2008

Table 8: Aerial LiDAR Specifications

7.1.2 AERIAL PHOTOGRAPH SPECIFICATIONS

PARAMETERS	**RFP SPECIFICATIONS**
GSD	10 cm
Band	RGB
End Overlap	30% Minimum
Side Overlap	20% Minimum
Photograph Format	Uncompressed Geotiff, Uncompressed Geotiff.
Radiometric Resolution	Minimum 8 Bit
Horizontal Datum	WGS-84
Map Projection	Universal Traverse Mercator (UTM)
Vertical Datum	**Orthometric:** All Deliverables are in SOI Vertical Datum (MSL) **Ellipsoid:** All Deliverables are in terms of WGS-84
Geoid Model	EGM-2008

Table 9: Aerial Photograph Specifications

7.1.3 SURVEY COMPONENTS WITH SPECIFICATIONS

Geokno owns Aerial LiDAR System, which can be fitted in any aircraft for Aerial Investigations. Aerial LiDAR System comprises of high-end configuration Airborne Laser Scanner, GNSS unit for position, Inertial Measurement Unit (IMU) for orientation and cameras for recording images which are all mounted on an aircraft. The survey component calibration certificates are attached as annexures.

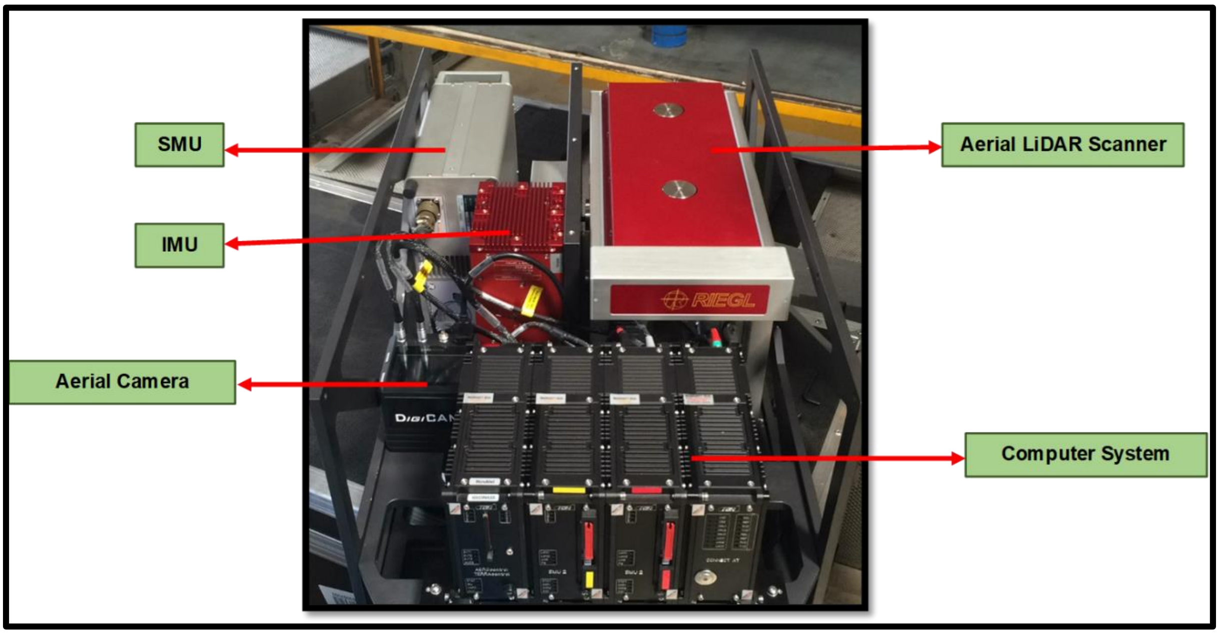


Figure 15: Aerial LiDAR Components

Details of available Aerial LiDAR System Components:

S. NO	DESCRIPTION	MAKE	MODEL
1.	Aircraft	Partenavia	P68 OBSERVER-2
2.	GNSS Antenna	Novatel	42GOXX16A4-XT-1-1
3.	IMU	IGI gmbh	IMU-iif
4.	LiDAR Sensor	RIEGL	Q780
5.	Aerial Camera	Phase One	DIGICAM iXU - RS1000

Table 10: Details of Aerial LiDAR Components

7.1.4 AIRCRAFT

The Pinnacle P68 is a light aircraft designed by Luigi Pascale and initially built by Italian Pinnacle. The original six-seat high-wing monoplane is powered by twin piston engines and is used for light transport and training, the P.68 Observer is an observation aircraft variant, and it was developed in a stretched, 10/11-seat twin turboprop derivative. Aircraft can hover up to a maximum limit of 25000 feet and has a maximum speed of 186 knots. The Pinnacle P.68 is powered by LYCOMING IO-360-AIBS Engine model.

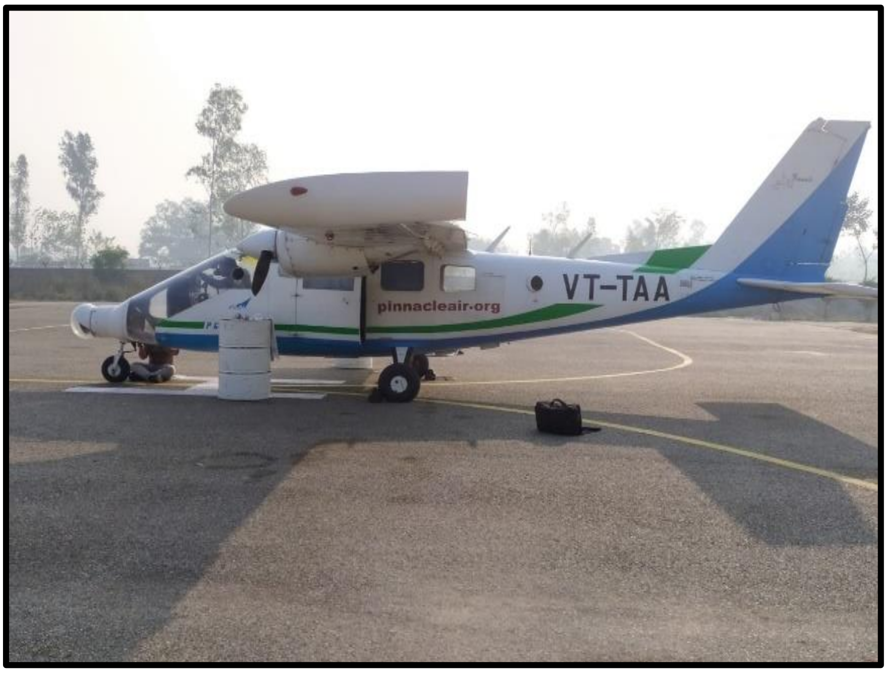


Figure 16: Pinnacle P68 Observer-2

S. NO	PERFORMANCE	PINNACLE P68
1	Speed	90 – 186 knots
2	Altitude	Up to 25,000 feett above MSL
3	Endurance	5 Hours 30 Minutes
4	Capacity	4 Persons

Table 11: Specifications of Aircraft

7.1.5 ON-BOARD GNSS

Figure 17: Aerial On-board GNSS

The Novatel - 42GOXX16A4-XT-1-1-Cert is an active L1/L2 dual-frequency GNSS antenna, offering combined GPS + GLONASS signal reception plus L-Band tracking. It is aircraft certified for navigation and suitable for any kind of Aerial Survey. L-Band offers real-time Differential GPS (DGPS) positioning with meter to decimeter level accuracy.

It has, Multi-constellation tracking to enhance solution availability and offers Precision positioning, even on long baselines. Enhanced differential performance with L-Band reception offers best compatibility for Aerial Survey purposes. GNSS receiver is fitted on top near ‘tail light’ for best signal reception. On Board GNSS receiver working along with Ground reference station will combine together to give the GPS solution for Flight Trajectory Determination. This technology ensures Global level accuracy at high level and geo-referencing the entire dataset globally.

S. NO	PERFORMANCE	AERIAL ON-BOARD GNSS
1	Number of Channels	120
2	Measurement Rate	2 Hz/sec
3	Signal Reception	GPS+GLONASS L1/L2 and BeiDou B1/B2 Signal reception
4	Signal Tracking	Dual frequency receiver L1/L2 plus L-Band, SBAS, QZSS Tracking
5	Maximum altitude	70,000 ft
6	Operating temperature	-55°C to +85°C (-67°F to +185°F)

Table 12: On-board GNSS Specifications

7.1.6 ON-BOARD IMU

AERO control is IGI's GNSS/IMU system for the precise determination of position and altitude of an Airborne Sensor. The AERO control system consists of an Inertial Measurement Unit (IMU-IIe) based on Fiber-Optic Gyros (FOG) and a Sensor Management Unit (SMU) with integrated high-end GNSS receiver.

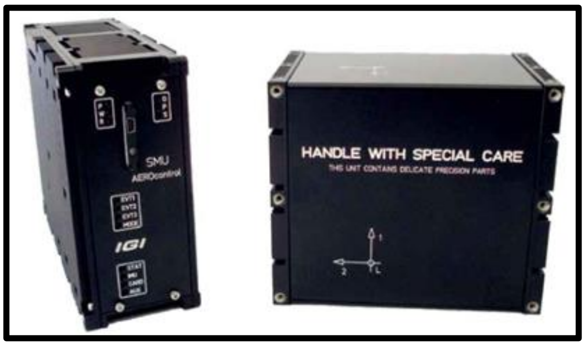


Figure 18: Aero Control Unit

This system provides Direct Geo-referencing of Airborne Sensor Data. Using Forward and Backward Kalman Filter Algorithm this system achieves optimal results even under challenging conditions. Depending on GNSS constellation and distance from GNSS Base Station, a positioning accuracy better than 0.05 m RMS and an altitude accuracy of 0.007^0 RMS for heading and 0.003^0 RMS for roll and pitch is achievable in post processing. It is fitted very close to the sensor to calculate Attitude (Roll, Pitch and Yaw) of the Aircraft. Every vibration (angular measurements) of the Aircraft is also recorded accurately. The GPS solution combined with IMU data gives the INSS solution which helps in absolute flight trajectory determination in relative to GNSS solution globally.

PERFORMANCE	AEROCONTROL-III
Position (m)	0.05
Velocity (m/s)	0.005
Roll/ Pitch (deg)	0.003
True Heading (deg)	0.007
Available Data Rates	400 Hz

Table 13: IMU Specifications

7.1.7 AERIAL LIDAR SENSOR

The RIEGL LMS-Q780 with up to 10 simultaneous pulses in the air, results in the most effective spacing on the ground. This eliminates the need of terrain following while retaining a high effective rate. Digital Signal Processing combined with RIEGL software suite delivers high quality LiDAR data. Its gives access to detailed target parameters by digitizing the echo signal online during data acquisition, and subsequent off-line waveform analysis. This method is especially valuable when dealing with difficult tasks, such as canopy height investigation or target classification.

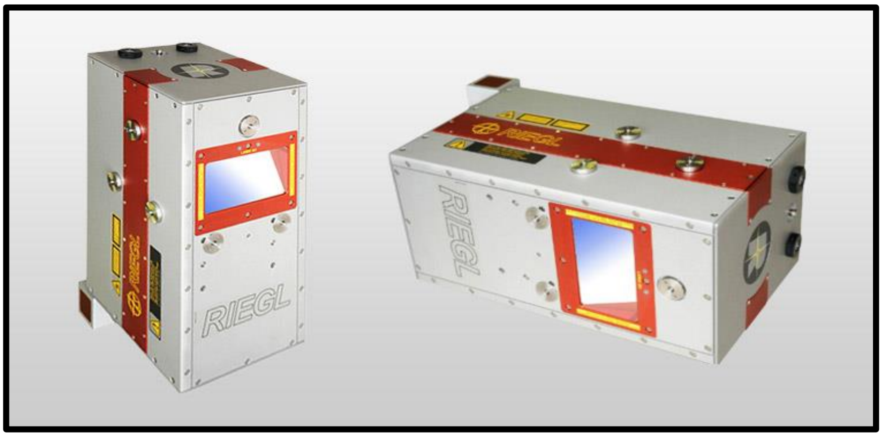


Figure 19: Aerial LiDAR Scanner

This instrument makes use of the time-of-flight distance measurement principle of infrared nanosecond pulses. Fast opto-mechanical beam scanning provides absolutely linear, unidirectional and parallel scan lines. The instrument is extremely rugged, therefore ideally suited for the installation on aircraft. This Aerial Scanner provides huge capability ranging from wide Area/High Altitude Mapping to Corridor Mapping.

PERFORMANCE	RIEGL LMS-Q780
Max Laser Pulse Repetition Rate (PRR)	400 kHz
Minimum Range	50 m
Accuracy	20 mm
Effective Measurement Rate	Up to 266000 meas./sec
Field of View (FOV)	Up to 60^o
Max. Operating Flight Altitude (AGL)	4700 m / 15,000 ft.

Table 14: LiDAR Scanner Specifications

7.1.8 AERIAL CAMERA

The Phase One aerial cameras are integrated medium format camera systems that are designed for aerial photography. Phase one aerial cameras are equipped with internal electronically controlled central leaf shutters to provide the image quality expected from a dedicated aerial photography camera.

CMOS technology enables high quality live view functions to be viewed remotely. Controlling all aspects of operation and exposure, with direct connection to a remote monitor on the ground, is made possible by Phase One’s iX Link Protocol and HDMI output.

Figure 20: Aerial Camera System

PERFORMANCE	AERIAL CAMERA
Resolution	100 MP
Dynamic Range	>86 dB
Camera Type	Medium format camera
Shutter Speed	Leaf Shutter: up to 1/1600 second
Output Format	Phase One Raw, TIF and JPG
RAW File Compression	IIQ: Large 100 MB IIQ: Small 65 MB

Table 15: Aerial Camera Specifications

7.1.9 DGCA AND MOD PERMISSION

The key task involved in Aerial LiDAR Survey is to obtain necessary permission from Ministry of Defence (MOD) and Director General of Civil Aviation (DGCA) for flying and acquiring Aerial LiDAR Data. A flow chart showing the permissions required from various Government Organization and which are mandatory before flying for capturing aerial data.

Geokno applied for DGCA Clearance through Kerala Rail Development Corporation Limited (KRDCL) and along with Non-Scheduled Operator Permit (NSOP) from M/s Pinnacle Air Private Limited, New Delhi. DGCA Application consists of Aircraft Details, NSOP, Type of Survey Instruments, and Personnel Involved.

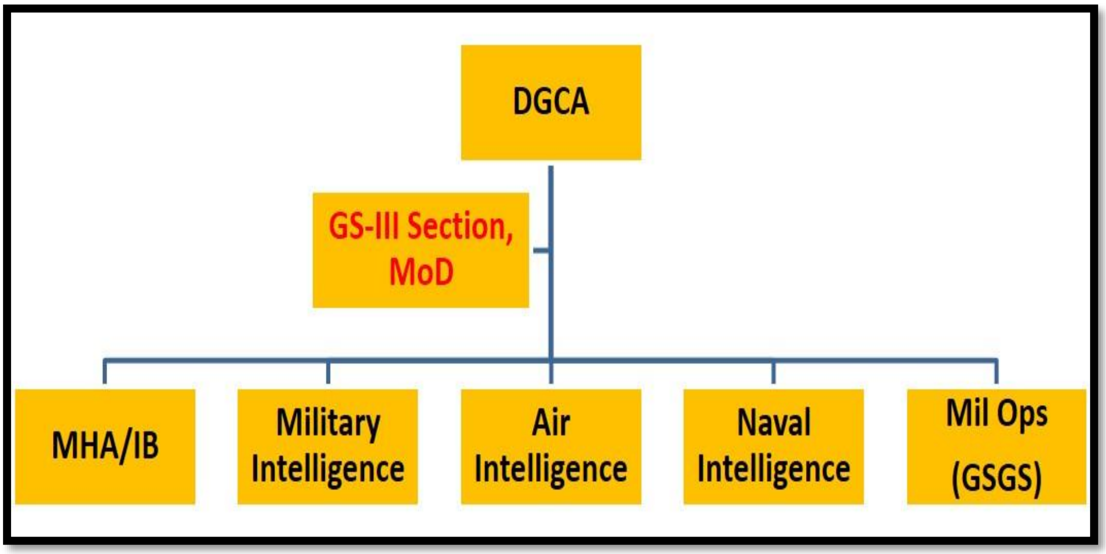
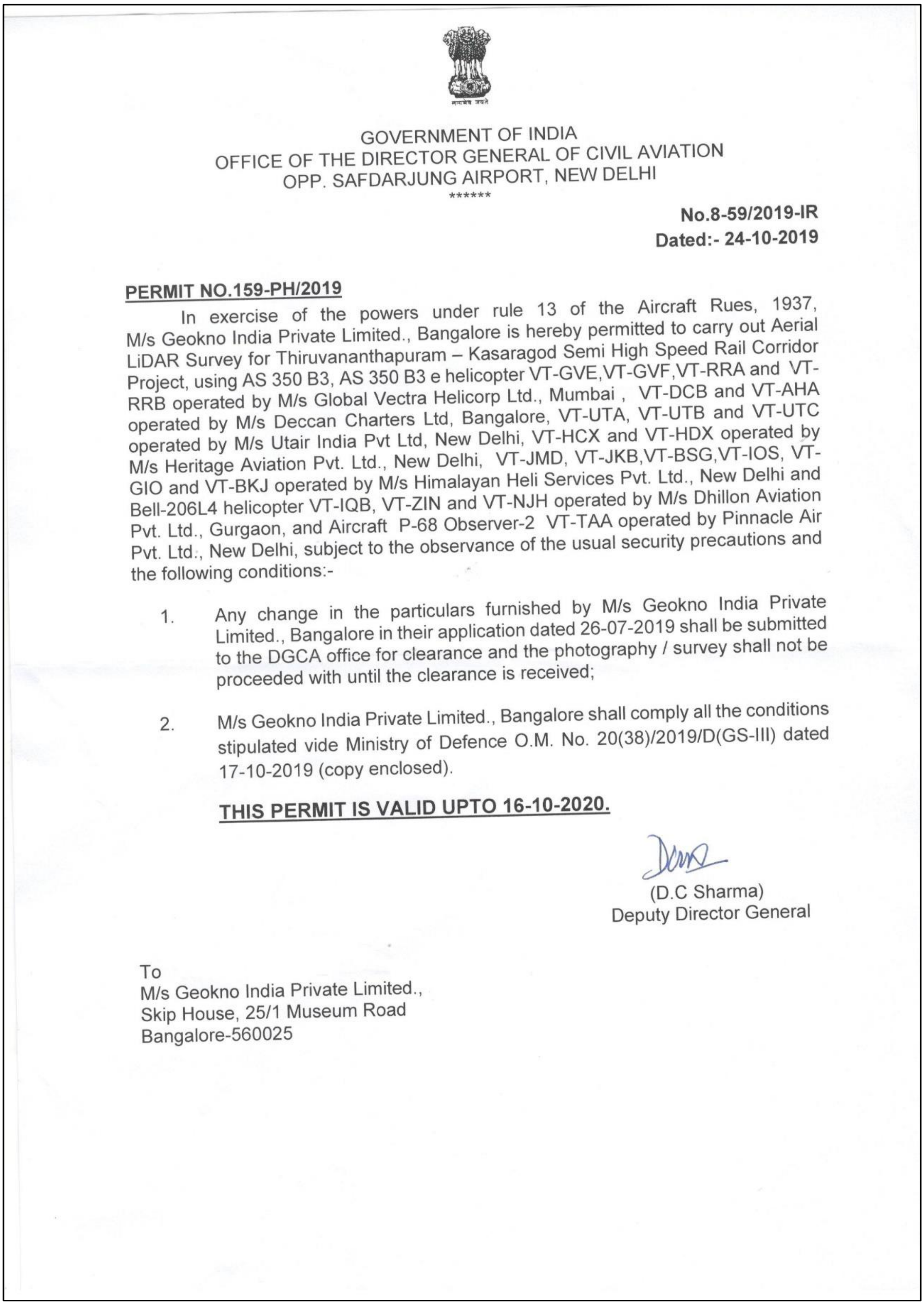


Figure 21: Flow Chart of MoD/DGCA Permission

Ministry of Defence accorded clearance for Aerial LiDAR Survey on 17th October 2019. After which, DGCA had accorded permissions on 24th October 2019 vide PERMIT NO: 159-PH/2019 to proceed with the data capturing through Aerial LiDAR Survey. DGCA had also directed Ministry of Defence for Aircraft Inspection for Fly Worthiness at New Delhi International Airport. The same was carried at IGI Airport New Delhi by officers of Military Intelligence, Air Intelligence, Military Operation (GSGS) and officers of Intelligence Bureau. After a thorough Inspection of Aerial LiDAR system, the clearance for the same was given on the next four days after inspection. Aerial LiDAR data capturing commenced on 31st December 2019 and was completed on 5th January 2019. Flying was carried out for 6 flying days, covering 6 sessions with nearly 28.9 flying hours.



सत्यमेव जयते

GOVERNMENT OF INDIA
OFFICE OF THE DIRECTOR GENERAL OF CIVIL AVIATION
OPP. SAFDARJUNG AIRPORT, NEW DELHI
******

No.8-59/2019-IR
Dated:- 24-10-2019

PERMIT NO.159-PH/2019

In exercise of the powers under rule 13 of the Aircraft Rues, 1937, M/s Geokno India Private Limited., Bangalore is hereby permitted to carry out Aerial LiDAR Survey for Thiruvananthapuram – Kasaragod Semi High Speed Rail Corridor Project, using AS 350 B3, AS 350 B3 e helicopter VT-GVE,VT-GVF,VT-RRA and VT-RRB operated by M/s Global Vectra Helicorp Ltd., Mumbai , VT-DCB and VT-AHA operated by M/s Deccan Charters Ltd, Bangalore, VT-UTA, VT-UTB and VT-UTC operated by M/s Utair India Pvt Ltd, New Delhi, VT-HCX and VT-HDX operated by M/s Heritage Aviation Pvt. Ltd., New Delhi, VT-JMD, VT-JKB,VT-BSG,VT-IOS, VT-GIO and VT-BKJ operated by M/s Himalayan Heli Services Pvt. Ltd., New Delhi and Bell-206L4 helicopter VT-IQB, VT-ZIN and VT-NJH operated by M/s Dhillon Aviation Pvt. Ltd., Gurgaon, and Aircraft P-68 Observer-2 VT-TAA operated by Pinnacle Air Pvt. Ltd., New Delhi, subject to the observance of the usual security precautions and the following conditions:-

1. Any change in the particulars furnished by M/s Geokno India Private Limited., Bangalore in their application dated 26-07-2019 shall be submitted to the DGCA office for clearance and the photography / survey shall not be proceeded with until the clearance is received;

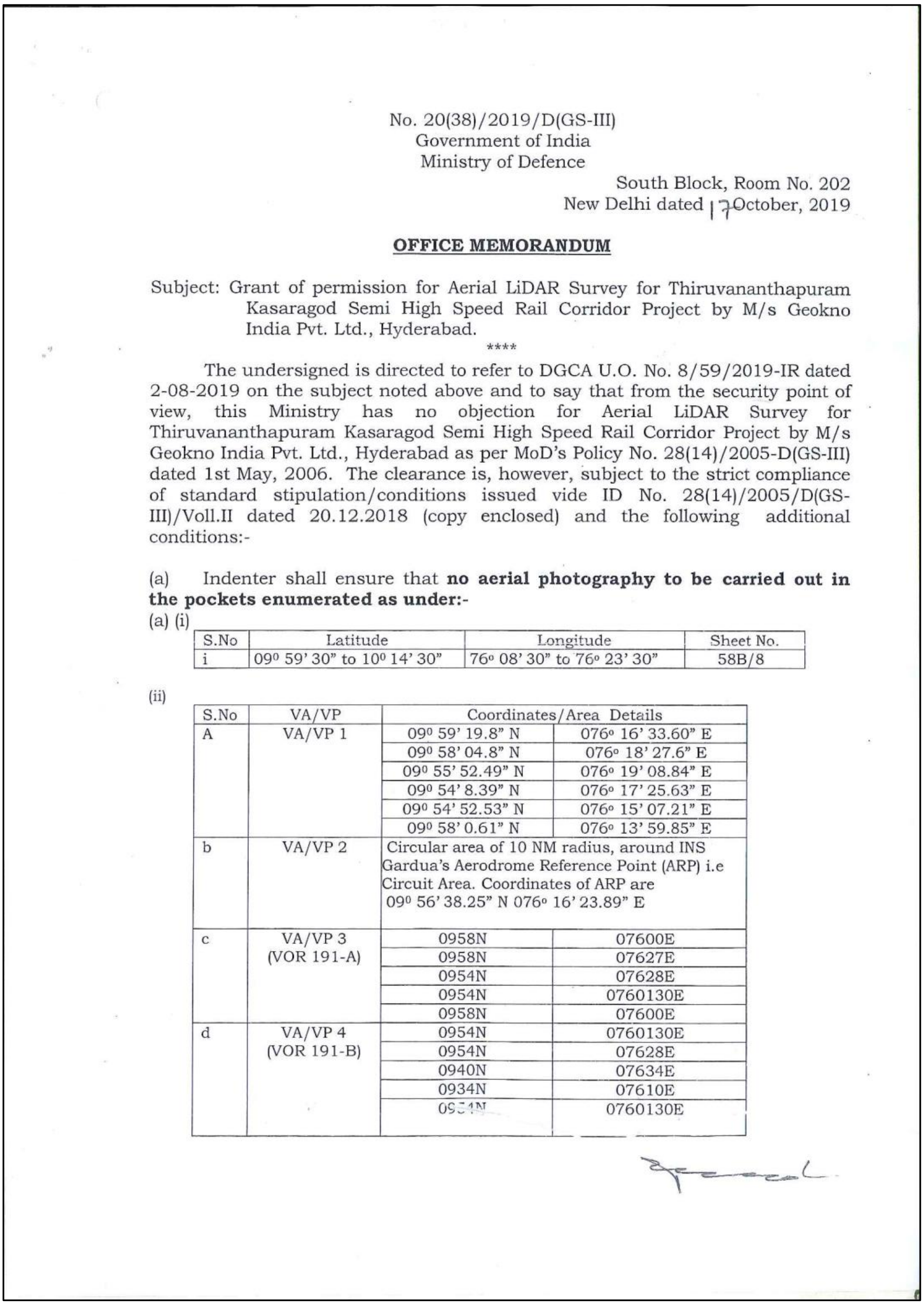
2. M/s Geokno India Private Limited., Bangalore shall comply all the conditions stipulated vide Ministry of Defence O.M. No. 20(38)/2019/D(GS-III) dated 17-10-2019 (copy enclosed).

THIS PERMIT IS VALID UPTO 16-10-2020.

(D.C Sharma)
Deputy Director General

To
M/s Geokno India Private Limited.,
Skip House, 25/1 Museum Road
Bangalore-560025

Figure 22: DGCA Permit Letter



No. 20(38)/2019/D(GS-III)
Government of India
Ministry of Defence

South Block, Room No. 202
New Delhi dated 17 October, 2019

OFFICE MEMORANDUM

Subject: Grant of permission for Aerial LiDAR Survey for Thiruvananthapuram Kasaragod Semi High Speed Rail Corridor Project by M/s Geokno India Pvt. Ltd., Hyderabad.

****

The undersigned is directed to refer to DGCA U.O. No. 8/59/2019-IR dated 2-08-2019 on the subject noted above and to say that from the security point of view, this Ministry has no objection for Aerial LiDAR Survey for Thiruvananthapuram Kasaragod Semi High Speed Rail Corridor Project by M/s Geokno India Pvt. Ltd., Hyderabad as per MoD's Policy No. 28(14)/2005-D(GS-III) dated 1st May, 2006. The clearance is, however, subject to the strict compliance of standard stipulation/conditions issued vide ID No. 28(14)/2005/D(GS-III)/Voll.II dated 20.12.2018 (copy enclosed) and the following additional conditions:-

(a) Indenter shall ensure that **no aerial photography to be carried out in the pockets enumerated as under:-**

(a) (i)

S.No	Latitude	Longitude	Sheet No.
i	09° 59’ 30” to 10° 14’ 30”	76° 08’ 30” to 76° 23’ 30”	58B/8

(ii)

S.No	VA/VP	Coordinates/Area Details	
A	VA/VP 1	09° 59’ 19.8” N	076° 16’ 33.60” E
		09° 58’ 04.8” N	076° 18’ 27.6” E
		09° 55’ 52.49” N	076° 19’ 08.84” E
		09° 54’ 8.39” N	076° 17’ 25.63” E
		09° 54’ 52.53” N	076° 15’ 07.21” E
		09° 58’ 0.61” N	076° 13’ 59.85” E
b	VA/VP 2	Circular area of 10 NM radius, around INS Gardua’s Aerodrome Reference Point (ARP) i.e Circuit Area. Coordinates of ARP are 09° 56’ 38.25” N 076° 16’ 23.89” E	
c	VA/VP 3 (VOR 191-A)	0958N	07600E
		0958N	07627E
		0954N	07628E
		0954N	0760130E
		0958N	07600E
d	VA/VP 4 (VOR 191-B)	0954N	0760130E
		0954N	07628E
		0940N	07634E
		0934N	07610E
		0954N	0760130E

Figure 23: MoD Issued Office Memorandum

7.1.10 AERIAL FLIGHT PLANNING

A flight planning consists of a flight (navigation) map which shows where the aerial photographs are to be taken and parameters (specifications) which outlines the specific requirements flying height, end lap, side lap. Flight planning must ensure photographic coverage of the entire area to be mapped in a minimum air time. Any obstacles to flying and any prohibited areas over which flights are forbidden or only allowed under strict precautions.

Flight planning is considered a crucial aspect of Airborne LiDAR surveys to contribute to total Quality Assurance (QA) experience. Careful assessment of the requirements and planning with adequate timing is vital for a successful mission completion. A good Flight planning requires careful and extensive consideration of various phases of the project. Flight plan optimization includes route, altitude, speed, and fuel optimization considered during the planning. Flight lines are planned and structured such that there would be sufficient LiDAR point density, overlap, and accuracy. The flight lines were flown at approximately 1000 feet Level (AGL). A summary of the Flight planning parameters for this project are shown in below:

Flight Mission Parameters	
Above Ground Level (AGL)	1000 Feet
Flying Hours	28 Hours
Times Per Turn	180 Sec
Pulse Repetition rate	400 KHz
Speed	110 Knots
Side overlap	60%
End overlap	30%
Point Density	10 Points Per Sq. m

Table 16: Flight Mission Parameters

Flight Planning defines the flight lines and other flight parameters through a simulation exercise, thus enabling LiDAR and/or image data of predefined specifications to be acquired at minimum costs. Flight planning explores the relationships between the LiDAR scanner, camera, aircraft, navigation sensors (GNSS and IMU), terrain features and other components. In Flight planning, the possible operation ranges of sensors including pulse repetition frequency (PRF), field of view (FOV), scan frequency, beam divergence, ground sampling distance (GSD), flying height, trajectory position and altitude.

The direction of flight, type of turning, maximum banking angle and cushion period (the time needed in addition to the time to fly from the end of one strip to the beginning of the next strip). The resulting flight plan was exported to be used with CCNS5 (Computer Controlled Navigation System) which was used by the flying crew and sensor operator. Capturing process has been done as per the Planned Flight lines. For every project flight planning is planned based on the analysis of study area DEM (Terrain conditions).

7.1.11 AERIAL DATA ACQUISITION

The Aerial flying took place between 9 am to 4 pm. However, the actual time varied on day today basis on the availability of air space and the permission granted by ATC. Utmost care was taken to ensure that flying should take place in cloud, fog, smoke, haze free condition under bright sunshine with moderate temperature condition.

The LiDAR flight team have maintained daily logs throughout the survey acquisition. These flight logs contain various information about the days flying conditions, sensor setup, date, project, lines flown, start and stop times for each line, and any other additional comments and attributes that may be relevant for that particular sorties. The Aerial data acquisition commenced on **31st December 2019 and completed on 05th January 2020.** The daily flight Log sheets, Daily data transfer records, Aerial data capture completion and submission forms are attached as annexure.

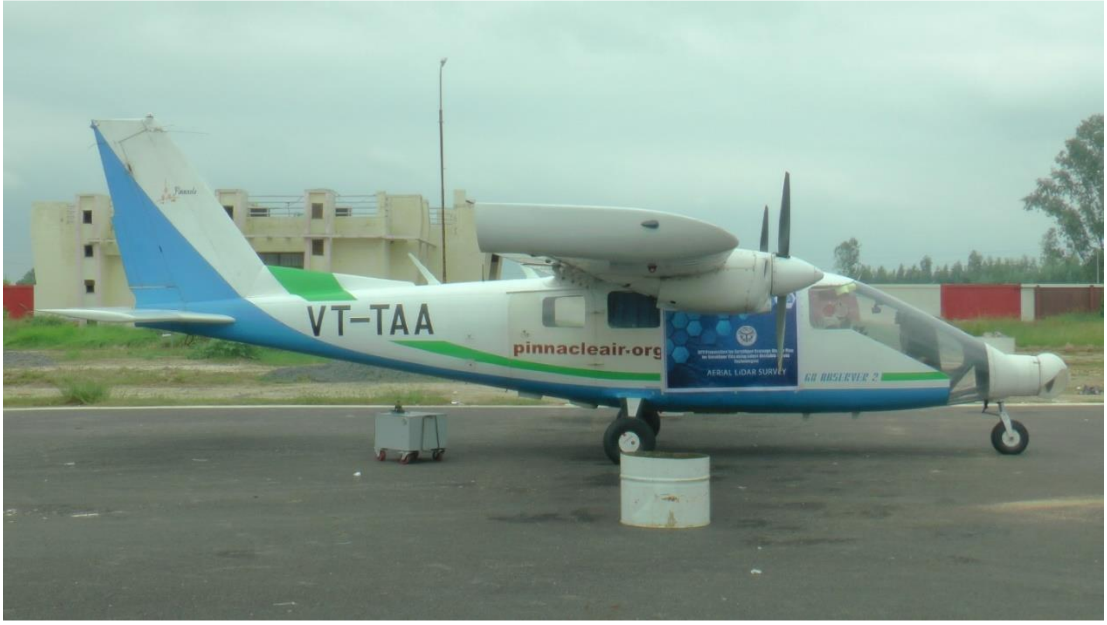


Figure 24: Partenavia P68 Observer2 fitted with Lite mapper LiDAR System

Figure 25: Aerial Survey Team

To accurately solve laser point position (coordinates x, y, z), the positional coordinates of the airborne sensor and the altitude of the aircraft have been recorded continuously throughout the LiDAR data collection mission. Aircraft position was measured twice per second (2 Hz) by an on board differential GNSS unit. Aircraft altitude was measured 400 times per second (400 Hz) as pitch, roll and yaw (heading) from an on board inertial measurement unit (IMU).

The Aerial flying period was from December 31st 2019 – 5th January 2020. The Flying was carried out in 6 days in 6 sessions for covering an alignment length of 601.03 km. On daily basis about 100 km alignment area was captured.

7.2 LIDAR CONTROL

The DGPS satellite constellation, which has a 23 hours and 56 minutes repeat cycle, taken into account to maximize the number of satellites available when conducting the survey. The Position Dilution of Precision (PDOP) is a quantification of how accurately one would be able to measure positions at a given time. Geokno conducted the survey during a time window, determined for the area of interest, during which PDOP is sufficiently low.

Differential DGPS techniques are used during Aerial LiDAR Survey for ensuring the accuracy and reliability of point cloud data. This technique works by having a static GNSS receiver (the base station) and a rover DGPS receiver (on the Helicopter/ Aircraft). Data are recorded in both the receivers and processed after the mission. The software used special techniques to improve the accuracy of the rover receiver by referencing the data recorded at the same time from the static receiver. For ensuring better accuracy, the maximum distance between the static and rover GNSS receivers are maintained at 25 km radius.

The DGPS survey control points were observed by using **the Leica Viva GS14 GNSS** receiver and static mode of observation was carried out at field. The DGPS survey control network was positioned in such a way that to form a triangle in the network every time a minimum of three DGPS receivers were simultaneously operated with common time observation to frame the triangle base lines. The Survey Control Networks resembles **"Network formed of Triangles"**. Survey control network was designed to make all the triangles well- conditioned in which no interior angle is less than 30 degrees nor more than 120 degrees. The DGPS post processing software **(Leica Geo Office)** was used for post-processing with differential correction. The static mode of DGPS observations over the survey control points were post processed to frame the baselines. After baselines computation the constrained network adjustment was carried out for the entire survey control network. For the Project Area, **43 Master Control Points, 116 Secondary Control Points** and **480 Checkpoints** were established.

The instrument used for this work of DGPS Control Network was **Leica Viva GS14 – GNSS Smart Antenna**. The Leica Viva GS14 is a compact and powerful GNSS smart antenna, suited for any measuring task with integrated mobile communications and UHF modem. The Leica Viva GS14 is easy-to-use with its convenient and integrated design. The Leica Viva GS14 is a powerful GNSS antenna which can access the four different GNSS constellations. It has the ability to function on two frequency channels simultaneously. It has the USB and RS232 serial ports to communicate with PCs. It contains the internal antenna for GSM/UMTS/CDMA phone modem. So we can use those networks for communication. It delivers data as Leica GNSS raw data and in RINEX format also.

DGPS PERFORMANCE		
GNSS technology	Leica Smart Track	Advanced four constellation tracking
Leica Smart Check	A continuous check of RTK solution	Reliability 99.99%
Signal tracking		GPS (L1, L2, L2C), GLONASS (L1, L2),
		BeiDou (B1, B2), GALILEO
		QZSS, SBAS (WAAS, EGNOS, MSAS, GAGAN)
Number of channels		120 (up to 60 satellites simultaneously on two frequencies)
MEASUREMENT PERFORMANCE & ACCURACY		
Time for initialization		Typically 4 s
Real-time kinematic	Single baseline	Hz 8 mm + 1 ppm / V 15 mm + 1 ppm
	Network RTK	Hz 8 mm + 0.5 ppm / V 15 mm + 0.5 ppm
Post processing	Static (phase) with long observations	Hz 3 mm + 0.1 ppm / V 3.5 mm + 0.4 –ppm
	Static and rapid static (phase)	Hz 3 mm + 0.5 ppm / V 5 mm + 0.5 ppm
Code differential	DGPS / RTCM	Typically 25 cm
COMMUNICATIONS		
Communication ports	Lemo	USB and RS232 serial
	Bluetooth	Bluetooth v2.00 + EDR, class 2
Communication protocols	RTK data protocols	Leica, Leica 4G, CMR, CMR+, RTCM 2.2, 2.3, 3.0, 3.1, 3.2 MSM
	NMEA output	NMEA 0183 V 4.00 and Leica proprietary
	Network RTK	VRS, FKP, iMAX, MAC (RTCM SC 104)
Built-in data links	3.75 G GSM / UMTS / CDMA phone modem	Fully integrated, internal antenna
	Radio modem	Fully integrated, receive and transmit, external antenna

		403 - 470 MHz, 1 W output power
External data links		GSM / GPRS / UMTS / CDMA and UHF / VHF modem
GENERAL		
Field controller and software	Leica SmartWorx Viva software	Leica CS10 and CS15 field controller
User interface	Buttons and LEDs	On / Off and Function button, 7 status LEDs
	Web server	Full status information and configuration options
Data recording	Storage	Removable micro SD card, 8 GB
	Data type and recording rate	Leica GNSS raw data and RINEX data at up to 20 Hz
Power management	Internal power supply	Exchangeable Li-Ion battery (2.6 Ah / 7.4 V)
	External power supply	Nominal 12 V DC, range 10.5 - 28 V DC
	Operation time	7 h receiving (Rx) data with internal radio, 5 h transmitting (Tx) data with internal radio, 6 h Rx/Tx data with internal modem

Table 17: DGPS Instrument Specification

GNSS Ground Control Survey operations consist of Establishing a Schedule of Operations, Pre-Survey, GNSS Data Collection, Data assessment and Initial Processing, and Computation. In each activity Standard Quality Assurance Plan / Check Lists are maintained.

7.2.1 ESTABLISHING A SCHEDULE OF OPERATIONS

This step involves determining the window of satellite configuration availability and scheduling the GPS sessions. Maximum data quality and collection efficiency are obtained by arranging data collection periods. This Schedule of Operations is planned using LGO 8.3 – Satellite Availability Module.

7.2.2 PRE-SURVEY: THE DAY BEFORE

Due to Challenging Terrain conditions, travelling from one place to another place at project site is time consuming. So Pre- Planning is important to arrive at the field site the day before the survey to charge all batteries, make note if GPS unit(s) can be charged through the automobile.

7.2.3 GNSS DATA COLLECTION

The Team warm up, check, and program the receiver for proper operation Log sheets containing critical information on position, weather, timing, height of instrument, and local coordinates are maintained. Once the session is completed, the receiving equipment are disassembled and stored. The log and tape files are documented and saved. If the survey to be performed spans multiple days, it is likely that the data are transferred from the DGPS to a laptop PC with some regularity. Data from the base station as well as the roving unit are collected with equal logging Interval.

7.2.4 COMPUTATION

This component uses the pre-processed data to compute the network of sites and give a full solution showing geographical coordinates (latitude, longitude and ellipsoidal height), distances of the vectors between each pair of sites in the network, and several assessments of accuracy of the various transformations and residuals of critical computations. This is usually accomplished by the Leica Geo Office 8.3 post-processing software. Field forms (Log Sheet) are checked for accuracy and completeness. The DGPS report attained and traverse register is included as annexures**.**

Field measurements recorded on the observation forms such as antenna height and station name are checked against data retrieved from the data collector.

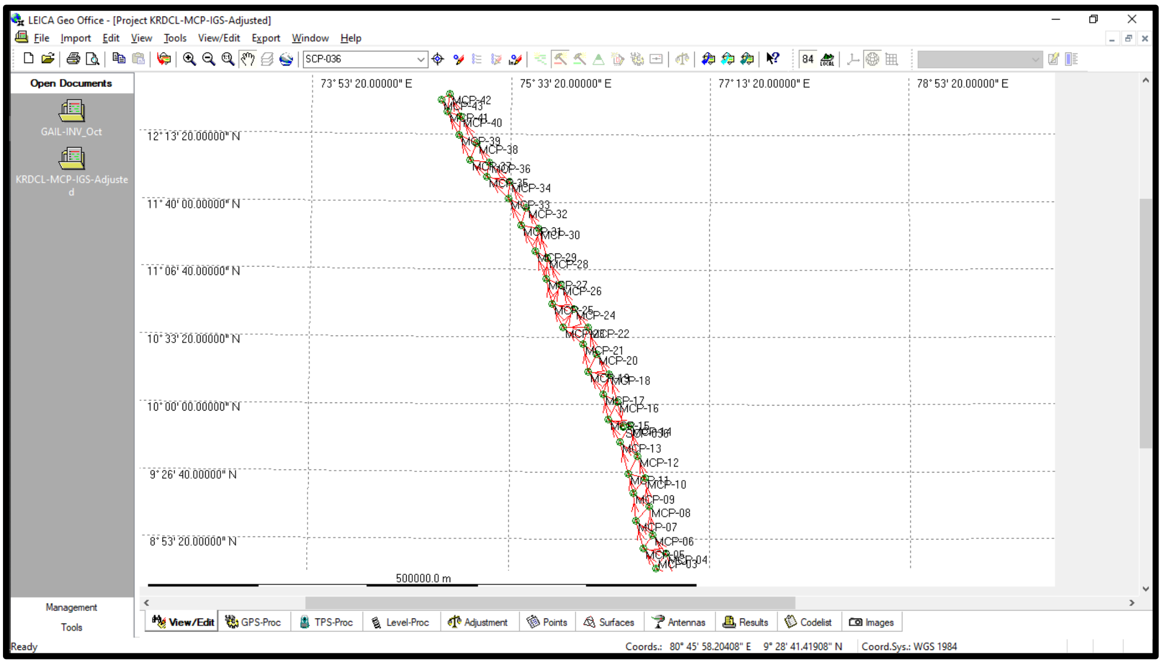
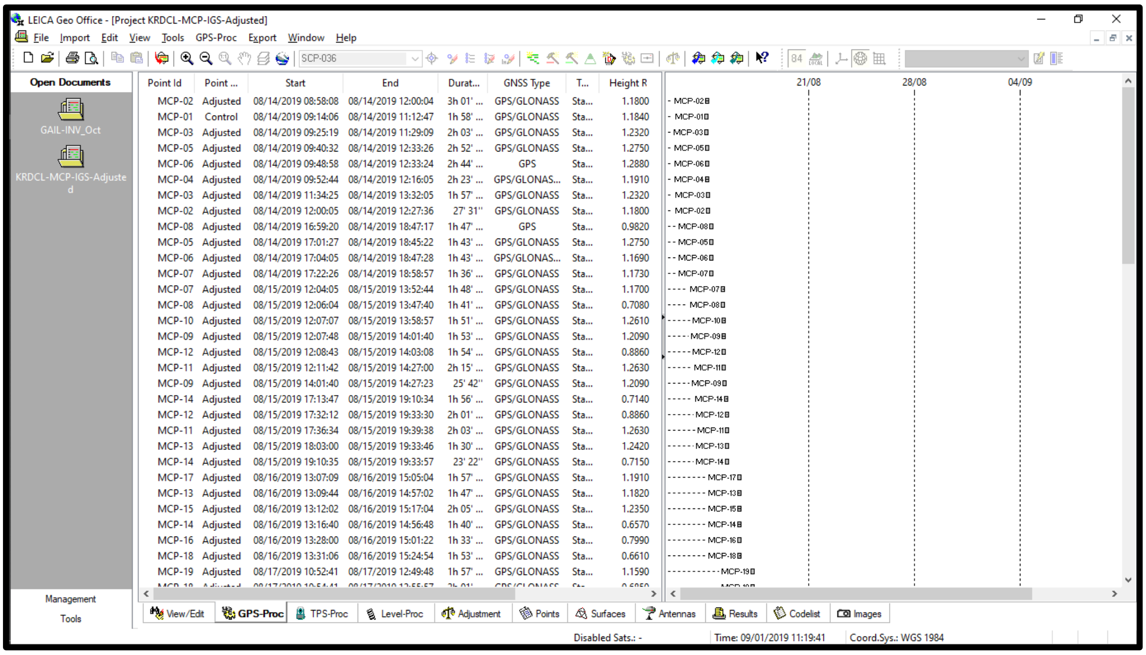


Figure 26: Leica Geo office view of Survey Baselines



Point Id	Point ...	Start	End	Durat...	GNSS Type	T...	Height R
MCP-02	Adjusted	08/14/2019 08:58:08	08/14/2019 12:00:04	3h 01' ...	GPS/GLONASS	Sta...	1.1800
MCP-01	Control	08/14/2019 09:14:06	08/14/2019 11:12:47	1h 58' ...	GPS/GLONASS	Sta...	1.1840
MCP-03	Adjusted	08/14/2019 09:25:19	08/14/2019 11:29:09	2h 03' ...	GPS/GLONASS	Sta...	1.2320
MCP-05	Adjusted	08/14/2019 09:40:32	08/14/2019 12:33:26	2h 52' ...	GPS/GLONASS	Sta...	1.2750
MCP-06	Adjusted	08/14/2019 09:48:58	08/14/2019 12:33:24	2h 44' ...	GPS	Sta...	1.2880
MCP-04	Adjusted	08/14/2019 09:52:44	08/14/2019 12:16:05	2h 23' ...	GPS/GLONAS...	Sta...	1.1910
MCP-03	Adjusted	08/14/2019 11:34:25	08/14/2019 13:32:05	1h 57' ...	GPS/GLONASS	Sta...	1.2320
MCP-02	Adjusted	08/14/2019 12:00:05	08/14/2019 12:27:36	27' 31''	GPS/GLONASS	Sta...	1.1800
MCP-08	Adjusted	08/14/2019 16:59:20	08/14/2019 18:47:17	1h 47' ...	GPS	Sta...	0.9820
MCP-05	Adjusted	08/14/2019 17:01:27	08/14/2019 18:45:22	1h 43' ...	GPS/GLONASS	Sta...	1.2750
MCP-06	Adjusted	08/14/2019 17:04:05	08/14/2019 18:47:28	1h 43' ...	GPS/GLONAS...	Sta...	1.1690
MCP-07	Adjusted	08/14/2019 17:22:26	08/14/2019 18:58:57	1h 36' ...	GPS/GLONASS	Sta...	1.1730
MCP-07	Adjusted	08/15/2019 12:04:05	08/15/2019 13:52:44	1h 48' ...	GPS/GLONASS	Sta...	1.1700
MCP-08	Adjusted	08/15/2019 12:06:04	08/15/2019 13:47:40	1h 41' ...	GPS/GLONASS	Sta...	0.7080
MCP-10	Adjusted	08/15/2019 12:07:07	08/15/2019 13:58:57	1h 51' ...	GPS/GLONASS	Sta...	1.2610
MCP-09	Adjusted	08/15/2019 12:07:48	08/15/2019 14:01:40	1h 53' ...	GPS/GLONASS	Sta...	1.2090
MCP-12	Adjusted	08/15/2019 12:08:43	08/15/2019 14:03:08	1h 54' ...	GPS/GLONASS	Sta...	0.8860
MCP-11	Adjusted	08/15/2019 12:11:42	08/15/2019 14:27:00	2h 15' ...	GPS/GLONASS	Sta...	1.2630
MCP-09	Adjusted	08/15/2019 14:01:40	08/15/2019 14:27:23	25' 42''	GPS/GLONASS	Sta...	1.2090
MCP-14	Adjusted	08/15/2019 17:13:47	08/15/2019 19:10:34	1h 56' ...	GPS/GLONASS	Sta...	0.7140
MCP-12	Adjusted	08/15/2019 17:32:12	08/15/2019 19:33:30	2h 01' ...	GPS/GLONASS	Sta...	0.8860
MCP-11	Adjusted	08/15/2019 17:36:34	08/15/2019 19:39:38	2h 03' ...	GPS/GLONASS	Sta...	1.2630
MCP-13	Adjusted	08/15/2019 18:03:00	08/15/2019 19:33:46	1h 30' ...	GPS/GLONASS	Sta...	1.2420
MCP-14	Adjusted	08/15/2019 19:10:35	08/15/2019 19:33:57	23' 22''	GPS/GLONASS	Sta...	0.7150
MCP-17	Adjusted	08/16/2019 13:07:09	08/16/2019 15:05:04	1h 57' ...	GPS/GLONASS	Sta...	1.1910
MCP-13	Adjusted	08/16/2019 13:09:44	08/16/2019 14:57:02	1h 47' ...	GPS/GLONASS	Sta...	1.1820
MCP-15	Adjusted	08/16/2019 13:12:02	08/16/2019 15:17:04	2h 05' ...	GPS/GLONASS	Sta...	1.2350
MCP-14	Adjusted	08/16/2019 13:16:40	08/16/2019 14:56:48	1h 40' ...	GPS/GLONASS	Sta...	0.6570
MCP-16	Adjusted	08/16/2019 13:28:00	08/16/2019 15:01:22	1h 33' ...	GPS/GLONASS	Sta...	0.7990
MCP-18	Adjusted	08/16/2019 13:31:06	08/16/2019 15:24:54	1h 53' ...	GPS/GLONASS	Sta...	0.6610
MCP-19	Adjusted	08/17/2019 10:52:41	08/17/2019 12:49:48	1h 57' ...	GPS/GLONASS	Sta...	1.1590

Disabled Sats.: -
Time: 09/01/2019 11:19:41
Coord.Sys.: WGS 1984

Figure 27: Leica Geo office view of Occupation details

7.2.5 LOCAL HEIGHT TRANSFORMATION

In Aerial LiDAR Survey, the LiDAR point cloud are in the WGS-84 which is a geocentric and earth-fixed coordinates system and are expressed in terms of geodetic coordinates (i.e. latitude, longitude and ellipsoidal height) or Cartesian coordinates (i.e. geocentric X, Y and Z). In other words, the height value obtained by using Aerial Survey method is ellipsoidal height which is the height above the WGS84 reference ellipsoid rather than the Ortho-metric height (or height above the geoid surface). Since the data obtained is in reference with ellipsoidal height, the Generation of project deliverables with respect to MSL heights will be computed by integrating SoI proposed Geoid model.

In general surveying measurements are made in relation to the geoid which is the equipotential surface of the earth gravity and not the ellipsoid because the instrument is aligned with the local gravity vector which is perpendicular to the geoid surface, normality through the use of a spirit bubble. The geoid height or the geoidal undulation (N) is described as the separation of the geoid from the ellipsoid, as shown in Figure.

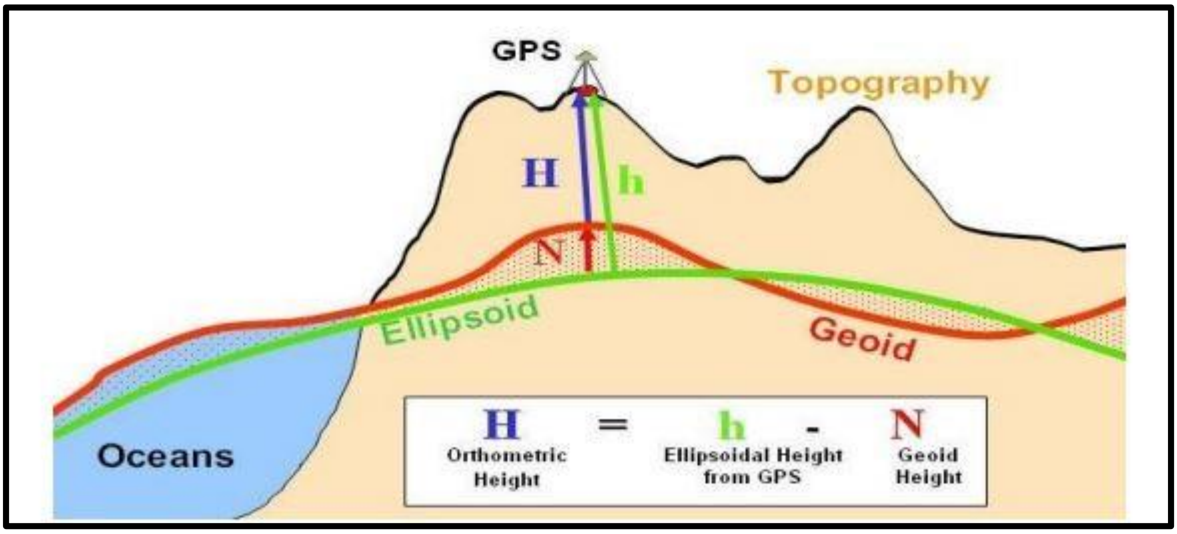


Figure 28: Schematic representation of Earth Surface, Geoid, and Ellipsoid along with Orthometric height, ellipsoidal height and Geoid height

Consequently, ellipsoidal heights cannot satisfy the project requirement and must be transformed to Orthometric heights (H). To accomplish this transformation between the ellipsoid heights and Orthometric heights, the geoidal undulation (N) from the ellipsoid must be known. Basically a WGS 84 ellipsoidal height (h) is transformed to an Orthometric height (H) by subtracting the geoid – WGS 84 – ellipsoid separation (N) which is called the geoid undulation. Depending on data availability and accuracy requirements, there are many principle approaches for determining Local Geoid models; some of the approaches are gravimetric method, geometric method and the astrogeodetic method. The geometric method involves the use of GPS and levelling data, where both the ellipsoidal and Ortho-metric heights are given. A mathematical relation depicting the surface of the geoid with regard to the reference ellipsoid is known as local geoid model.

$$\boxed{N = h - H}$$

All the primary control points geoidal undulation (N) are calculated by using GNSS observed Ellipsoidal height and MSL value. Project specific Local geoid model are developed by using the undulation value. This Local geoid model are supplied to Aerial survey team for adjusting the vertical height into MSL.

The Survey of India (SoI) is the nodal agency maintaining the GTS Benchmarks throughout the country. The existing Benchmarks were requested and collected from Survey of India. The Geodetic and Research Branch, Survey of India, dispatched the list of all available GTS Benchmarks in and around the project area. Ground truth verification of the received GTS Benchmarks was carried out and their stability were investigated.

Digital Levels and bar-coded staffs were used for vertical network densification. The forward and backward levelling with 6-8 Kms Loop closure method was used to densify the vertical control network. The forward levelling is starting from the known point to the most distant point in the loop. While the backward levelling is from this last distant point to the known point. These two are basically part of one levelling loop. Every levelling loop employed in the vertical control densification was closed and adjusted.

Digital Levels and bar-coded staffs helped in minimizing the error due to manual interpolation of staff reading. Further, the level network in this project run through mainly road pavement and other hard flat surfaces, thus minimizing the chances of settlement of staff between foresight and back-sight. Because of these reasons the loop closure error was limited to sub-millimeter level.

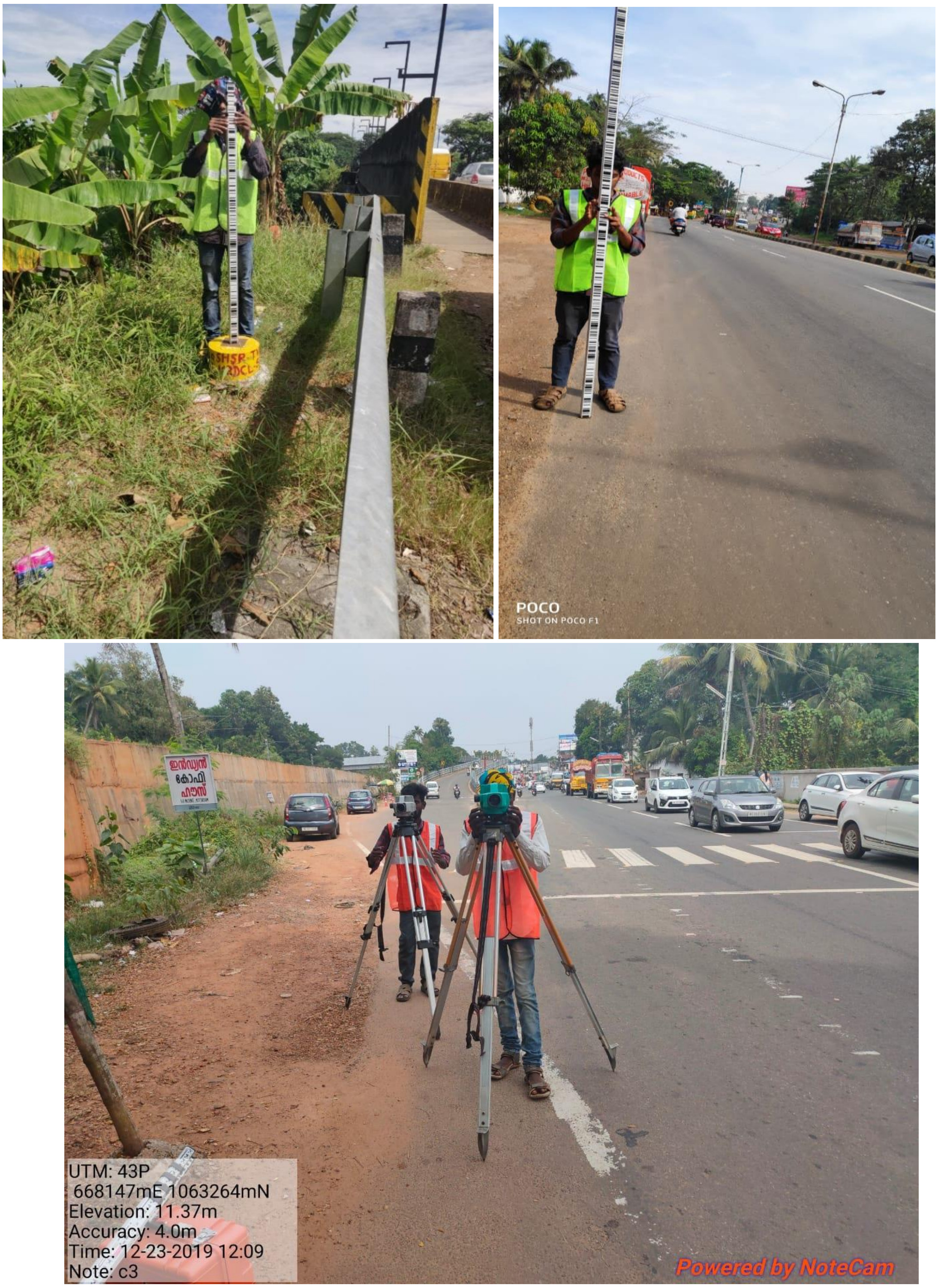


Figure 29: Local Height Transformation using Digital Level instruments

The Survey Control Network which has been already established with GNSS receivers and their Co-ordinates (Latitude, Longitude, Ellipsoidal Height) were computed using Leica Geo Office software. The Survey control station's Mean Sea Level (MSL) were determined by Levelling method. First UTM Grid Co-ordinates (i.e. Northing, Easting and Ortho Height) were computed using the WGS-84 Geodetic Co-ordinates and EGM 2008 Model.

Then a second order transformation model that accounts for the spatial distribution of BMs was developed between the local vertical datum (i.e. SoI MSL) heights and the Ortho Heights resulting using EGM 2008. The height transformation model developed for localized height transformation was then used for LiDAR data height transformation from EGM 2008 derived Ortho Height to MSL.

7.3 AIRBORNE GPS KINEMATIC

On-board kinematic GPS mounted on the platform & IMU data were corrected with the base station data. The distance between the on-board GPS, Base & Auxiliary base station is maintained within 30 – 50 km.

7.4 GENERATION AND CALIBRATION OF LASER POINTS (RAW DATA)

The bore-sighting angles and lever-arm offsets, which are known as the mounting parameters, between the system's components are also needed for the computation of the ground coordinates of the laser points. The mounting parameters together with other system parameters are derived through a calibration process, which is usually accomplished in several steps:

a. Laboratory calibration
b. Platform calibration

In the laboratory calibration, which is conducted by the system manufacturer, the individual system components are calibrated. In addition, the eccentricity and misalignment between the laser mirror and the IMU as well as the eccentricity between the IMU and the sensor reference point are determined.

In the platform calibration, the eccentricity between the sensor reference point and the GNSS antenna is determined. The in-flight calibration utilizes a calibration test fly in any pitch roof and flat surface area, flying will be conducted in different flying heights and angles on minimum 8 times over the same pitch roof and flat surface area. This multiple LiDAR data is then adjusted for the discrepancies and thus the finalized calibration values (i.e. roll, pitch and yaw) were derived. The observed discrepancies between the LiDAR-derived and control surfaces are used to refine the mounting parameters and systematic errors in the system measurements (mirror angles and ranges).

7.5 ABSOLUTE AND RELATIVE ACCURACY

Absolute Accuracy is defined as a measure that accounts for all systematic and random errors in a data set. Absolute accuracy is stated with respect to a defined datum or reference system.

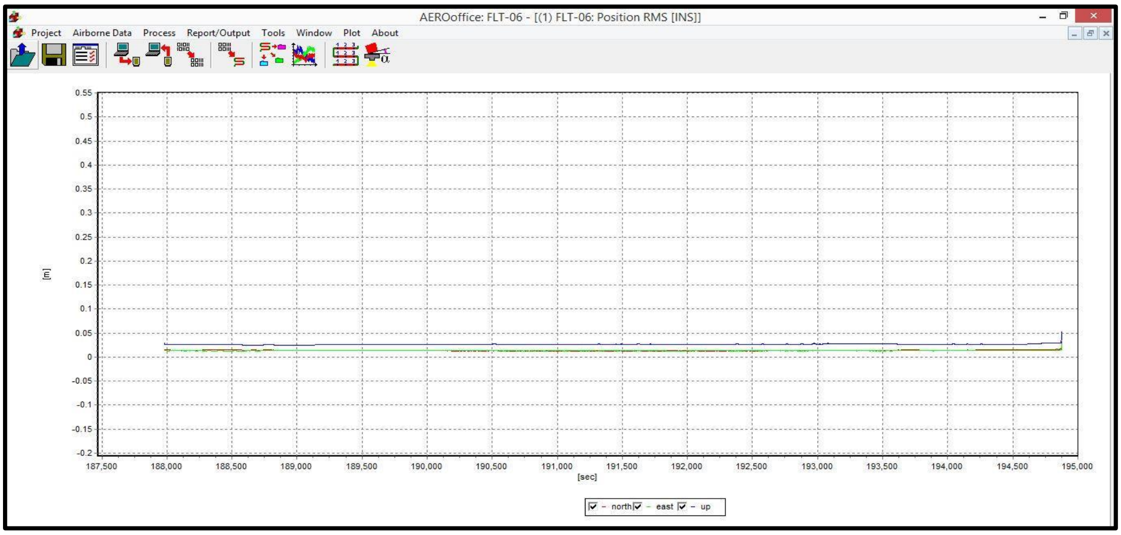


Figure 30: Graph showing absolute accuracy

Relative accuracy is a measure that accounts for random errors in a data set. Relative accuracy may also be referred to as point-to-point accuracy.

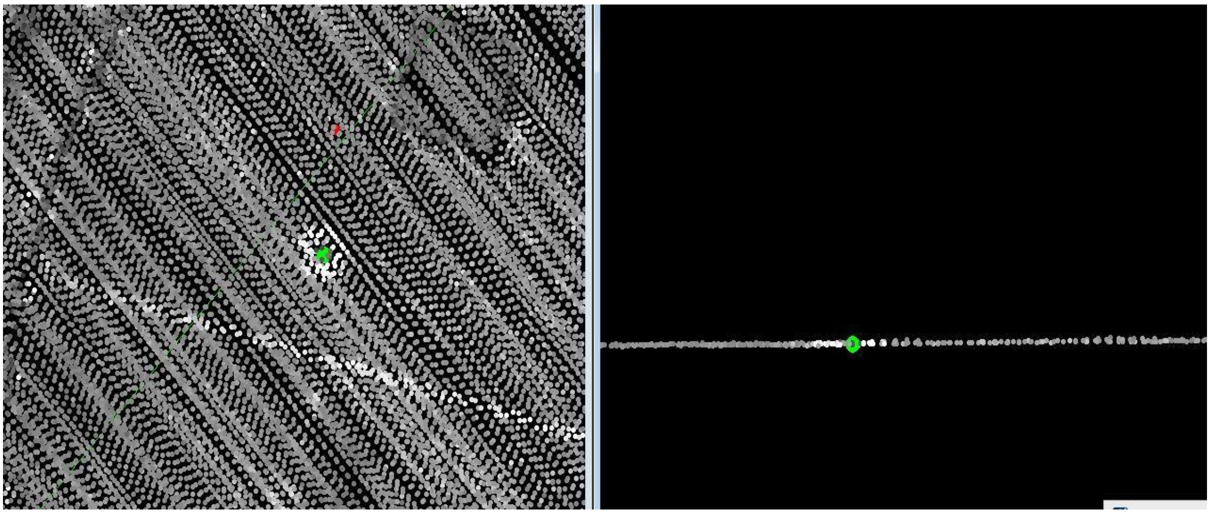


Figure 31: Micro station View of relative accuracy

7.6 PREMILINARY VERTICAL ACCURACY ASSESSMENT

In Aero Office Software, preliminary accuracy assessment is done by analyzing the INS trajectory solution, satellites observed, PDOP for the respective flight missions. Also target points marked along the center line of the corridor have been checked for the vertical accuracy assessment.

7.7 FINAL SWATH VERTICAL ACCURACY ASSESSMENT

Swath is the area covered by field of view during data capturing. In this project there are lot of swath was obtained with different flight lines. These different swath having small difference in horizontal and vertical position, so these swaths are not matching without adjustment. So these swaths to swath is unique for tying adjacent flight lines or cross flight lines. In this project mostly cross flight lines are used to adjust the swath.

8 LIDAR PROCESSING & QUALITATIVE ASSESSMENT

8.1 LIDAR DATA PRE-PROCESSING

Beginning the LiDAR data processing the GNSS had been extracted and computed to give the best possible positional accuracies. The IMU data was analysed and the lever arms were corrected to achieve consistent airborne data. Upon the creation of the Trajectory file, the LAS files were computed using proprietary post-processing software. The Quality analyst thoroughly review for any quality issues with the data. This includes data voids, high and low points, and data gaps between successive sessions.

The data voids or high points could be the result of any high elevation point returns, including clouds, steam from industrial plants, flocks of birds, or any other anomaly. The LiDAR Data Pre-Processing Flow Chart for Aerial LiDAR are shown below.

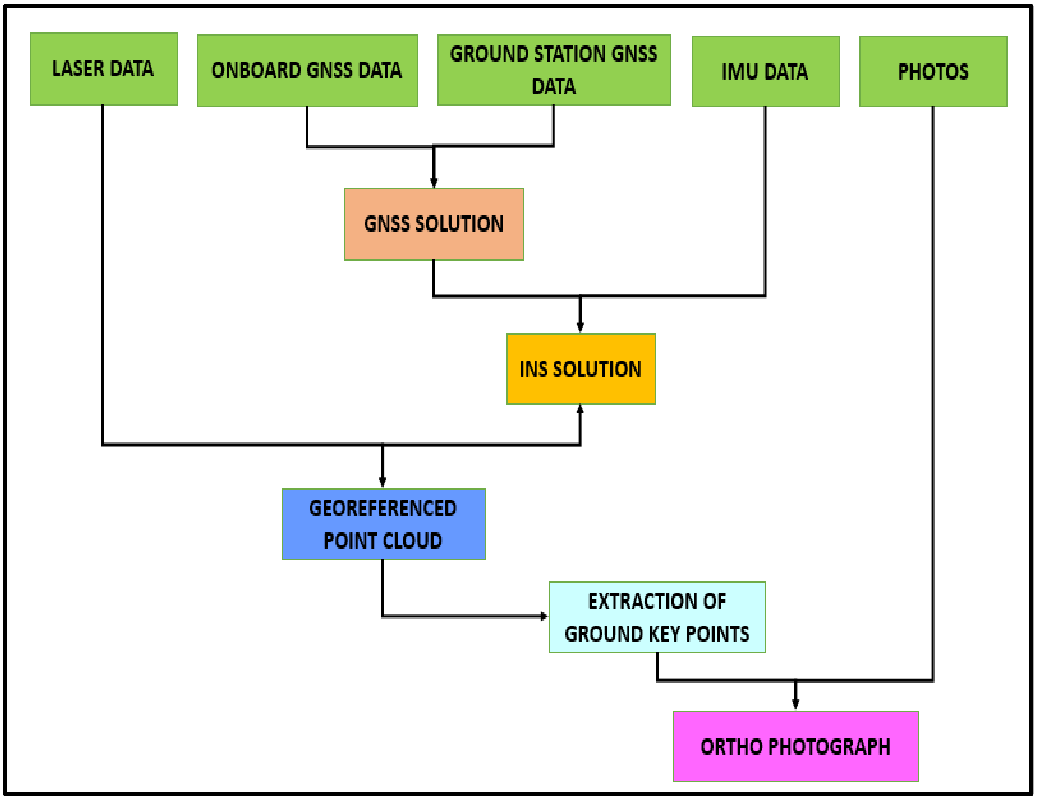


Figure 32: Aerial LiDAR Data Pre-Processing Flow Chart

The following types of errors have been computed from the raw point cloud and suitable corrections were applied to calibrate the point cloud:

- Heading – to eliminate the displacement error of point cloud along xy plane
- Roll – to eliminate the displacement error of point<cloud along yz plane.
- Pitch – to eliminate the displacement error of point<cloud along the xz plane.
- dZ – to eliminate

8.1.1 IMPORTING IMU AND ON-BOARD GPS DATA

An Inertial Measurement unit (IMU) is an electronic device that measures the body's specific force, angular rate and at times the magnetic field surrounding the body using the combination of accelerometers and gyroscopes. An IMU works by sensing the motion including the type, rate and direction of the motion. The in – built GPS system delivers precise information about the attitude of the sensor: roll, pitch, and yaw which provides the origin point of the pulse. Both the IMU and GPS data are stored in the Aero Control Card. The data are downloaded from the Aero Control Data Unit using the Aero Office software and the same are separated for further processes.

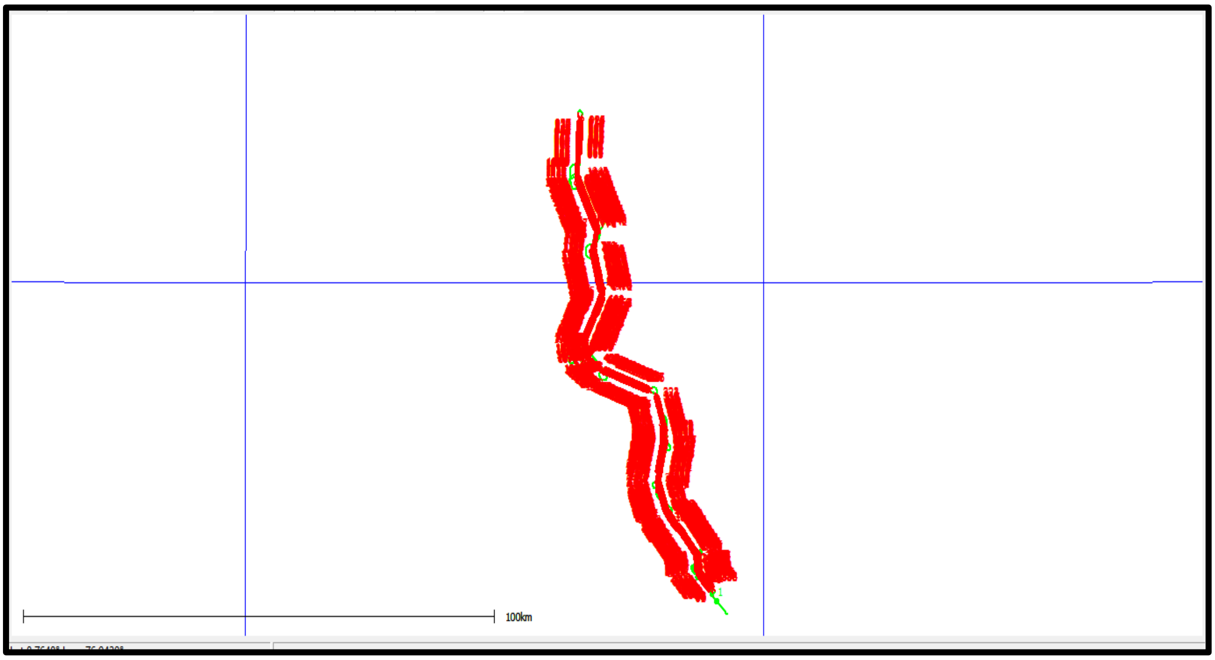


Figure 33: Importing IMU and On-Board GPS Data

8.1.2 GPS TRAJECTORY SOLUTION

The Ground DGPS points data from the Ground Reference Station collected from the field team and the GPS from the on-board GPS systems are combined using GrafNav Various Graphs (Estimated Position

Accuracy, Number of satellites etc.) are generated and analysed hence obtaining the GPS Trajectory Solution.

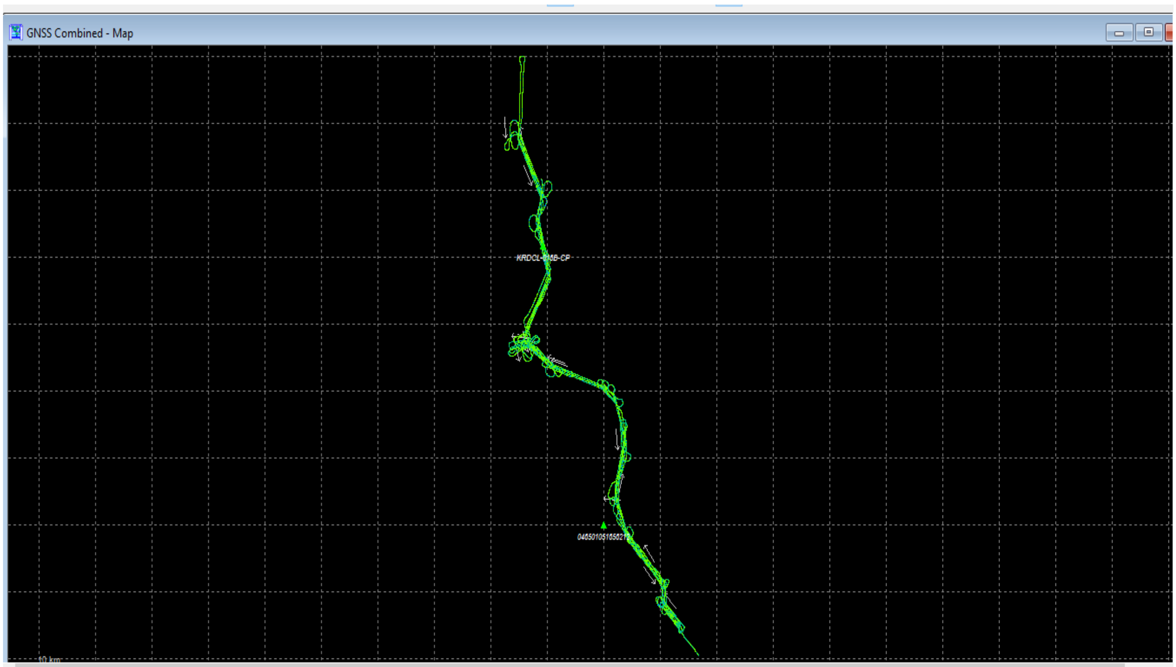


Figure 34: Combined Base and On Board GPS

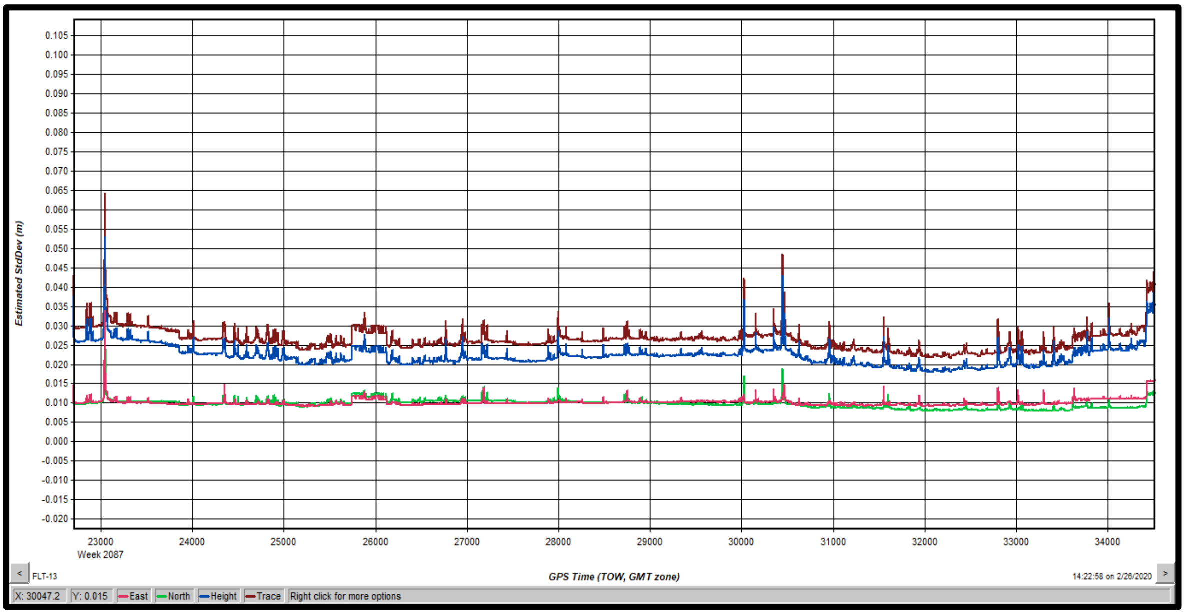


Figure 35: Estimated Position Accuracy

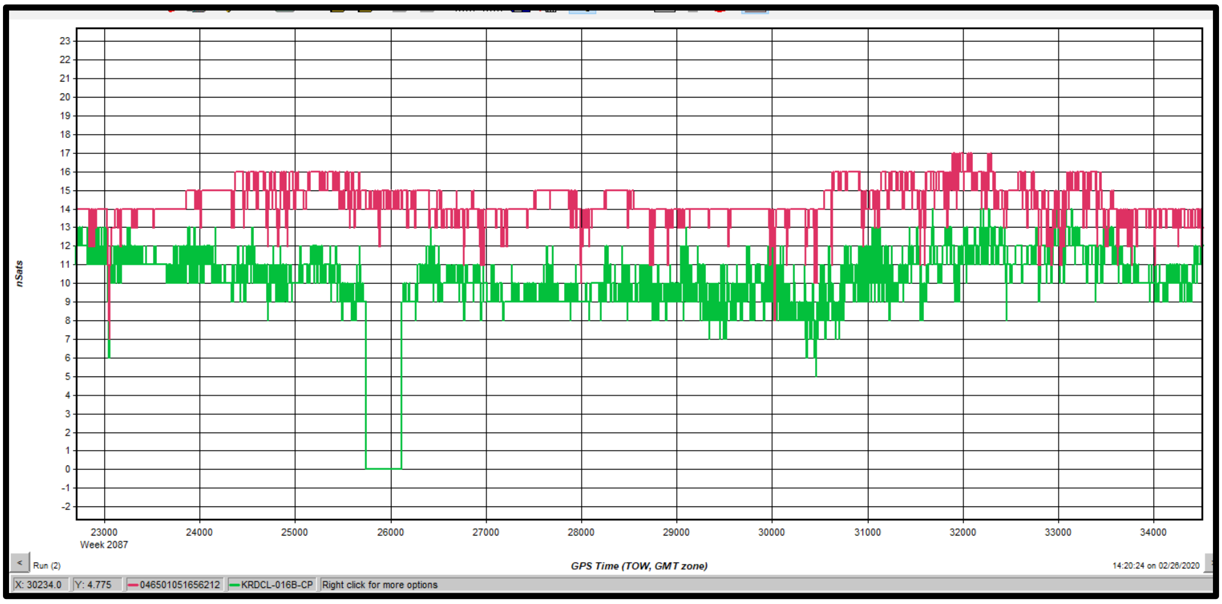


Figure 36: Number of Satellites

8.1.3 INS TRAJECTORY SOLUTION

The trajectory data obtained from the GrafNav software and the IMU data obtained from the Aero Office software are merged and processed in Aero Office. Various graphs like INS position RMS, Gyro-Bias etc. are generated and analysed. The process helps in obtaining the INS trajectory solution.

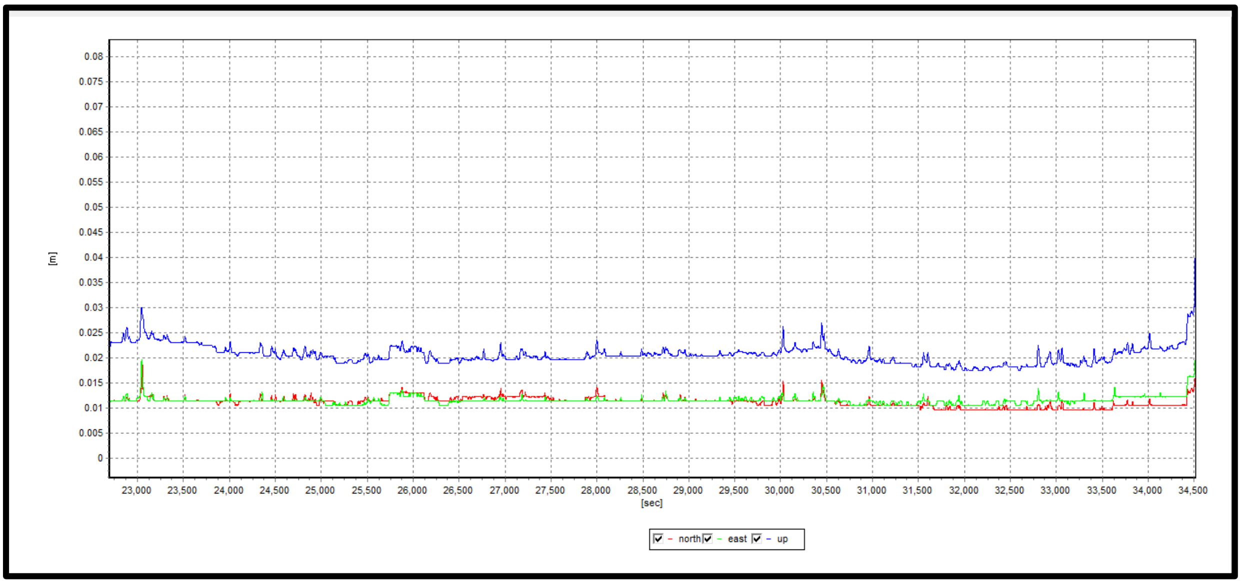
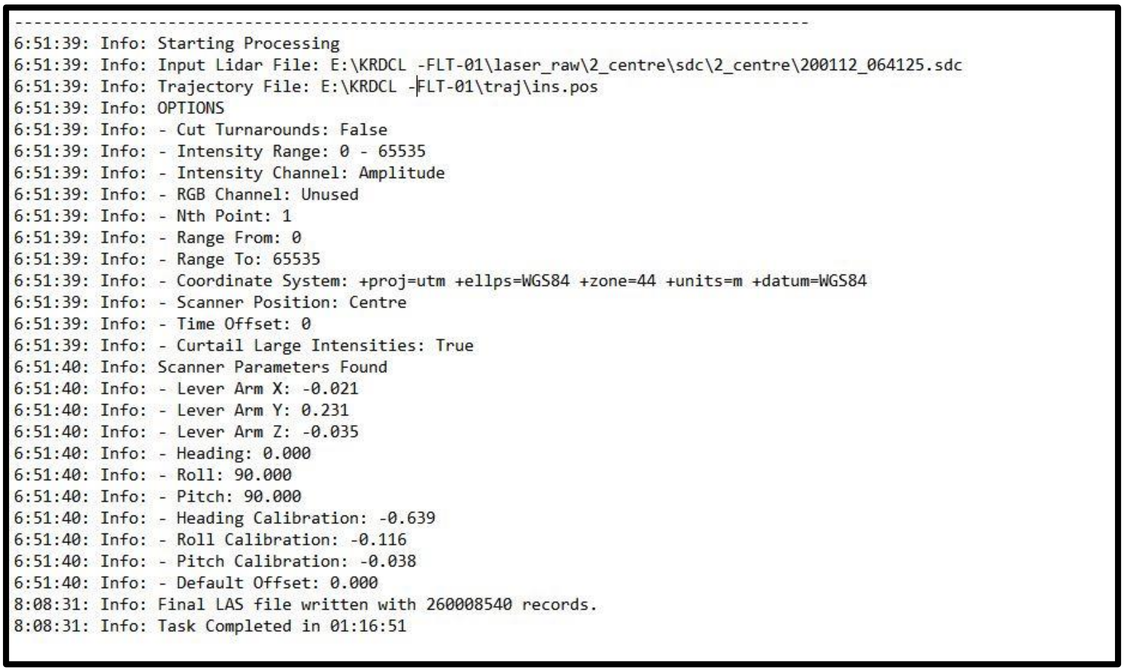


Figure 37: INS Position RMS

8.1.4 GEO REFERENCING LASER POINTS

The corrected INS trajectory is used to Geo reference the laser points. Hence converting the raw laser points into a generic format (. las). The geo referenced laser points contains the following details:

1) Easting
2) Northing
3) Elevation
4) Intensity
5) Scan Angle
6) GPS Time
7) Flight Line Number etc.

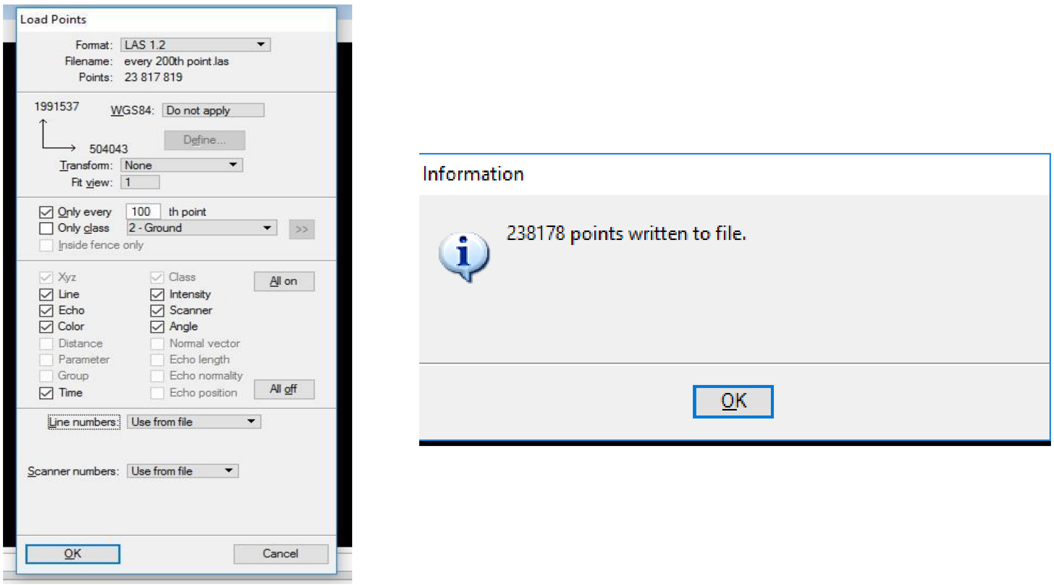


```
---------------------------------------------------------------------------------
6:51:39: Info: Starting Processing
6:51:39: Info: Input Lidar File: E:\KRDCL -FLT-01\laser_raw\2_centre\sdc\2_centre\200112_064125.sdc
6:51:39: Info: Trajectory File: E:\KRDCL -FLT-01\traj\ins.pos
6:51:39: Info: OPTIONS
6:51:39: Info: - Cut Turnarounds: False
6:51:39: Info: - Intensity Range: 0 - 65535
6:51:39: Info: - Intensity Channel: Amplitude
6:51:39: Info: - RGB Channel: Unused
6:51:39: Info: - Nth Point: 1
6:51:39: Info: - Range From: 0
6:51:39: Info: - Range To: 65535
6:51:39: Info: - Coordinate System: +proj=utm +ellps=WGS84 +zone=44 +units=m +datum=WGS84
6:51:39: Info: - Scanner Position: Centre
6:51:39: Info: - Time Offset: 0
6:51:39: Info: - Curtail Large Intensities: True
6:51:40: Info: Scanner Parameters Found
6:51:40: Info: - Lever Arm X: -0.021
6:51:40: Info: - Lever Arm Y: 0.231
6:51:40: Info: - Lever Arm Z: -0.035
6:51:40: Info: - Heading: 0.000
6:51:40: Info: - Roll: 90.000
6:51:40: Info: - Pitch: 90.000
6:51:40: Info: - Heading Calibration: -0.639
6:51:40: Info: - Roll Calibration: -0.116
6:51:40: Info: - Pitch Calibration: -0.038
6:51:40: Info: - Default Offset: 0.000
8:08:31: Info: Final LAS file written with 260008540 records.
8:08:31: Info: Task Completed in 01:16:51
```

Figure 38: Geo-reference Points

8.1.5 IMPORTING LASER POINTS

The laser points in the generic format (. las format) are imported into the Micro station – TerraSolid based on the size of the data. If the size of the data is more than 50 million points, they are separated by creation of blocks.



Load Points

Format: LAS 1.2
Filename: every 200th point.las
Points: 23 817 819

1991537
504043
WGS84: Do not apply
Transform: None
Fit view: 1

☑ Only every 100 th point
☐ Only class 2 - Ground
☐ Inside fence only

☑ Xyz
☑ Line
☑ Echo
☑ Color
☐ Distance
☐ Parameter
☐ Group
☑ Time
☑ Class
☑ Intensity
☑ Scanner
☑ Angle
☐ Normal vector
☐ Echo length
☐ Echo normality
☐ Echo position

Line numbers: Use from file
Scanner numbers: Use from file

Information

238178 points written to file.

Figure 39: Importing Points

8.1.6 FLIGHT LINE ADJUSTMENT

The Ground classification is performed on the laser points and Tie lines are created based upon the classification providing solution for tie line. Based upon the tie line solution, the Flight Line Adjustments are performed.

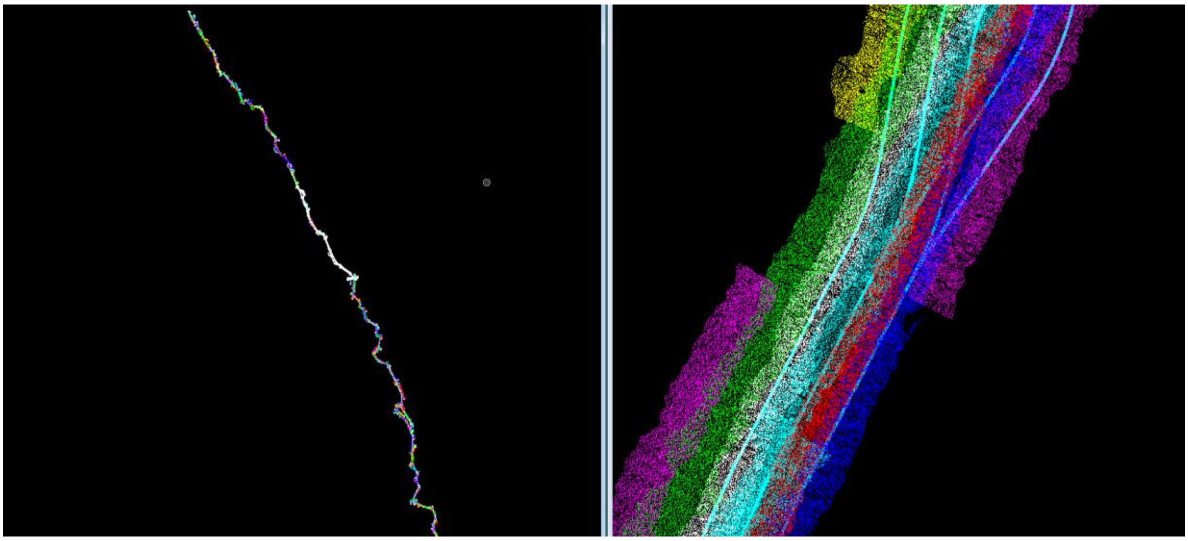


Figure 40: Adjusted Flight Line

8.1.7 GROUND CONTROL POINTS CORRECTION

The correction of the Ground Control Points are performed. It is done by collecting the Ground Control Network from the DGPS team. The Georeferenced point cloud data is shown in the following image.

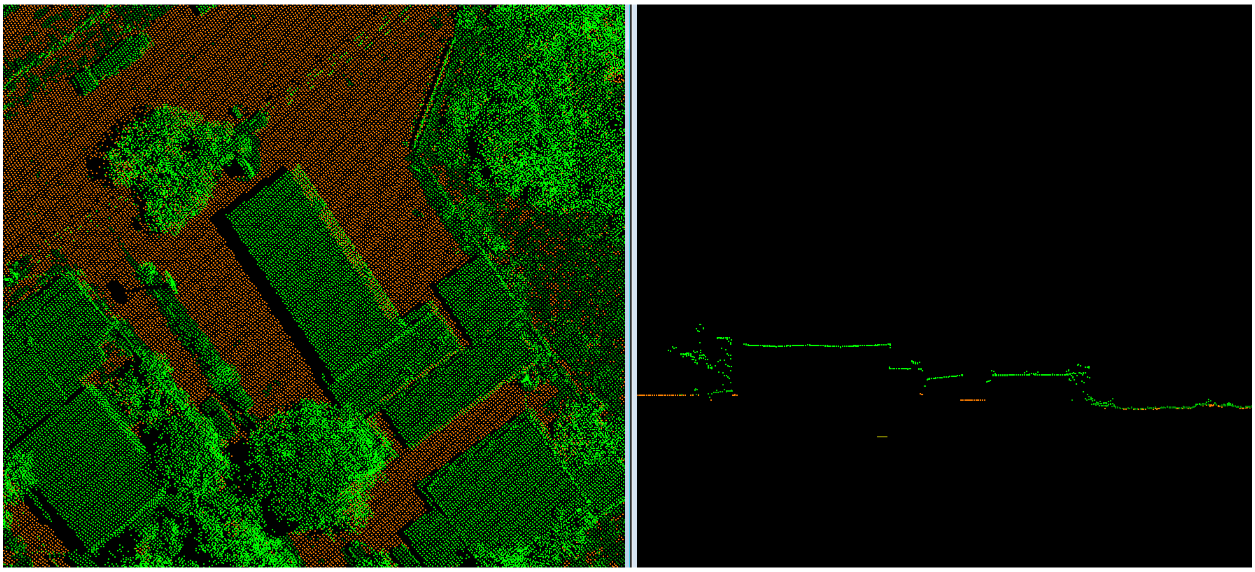


Figure 41: Geo Referenced Point Cloud with cross-sectional view

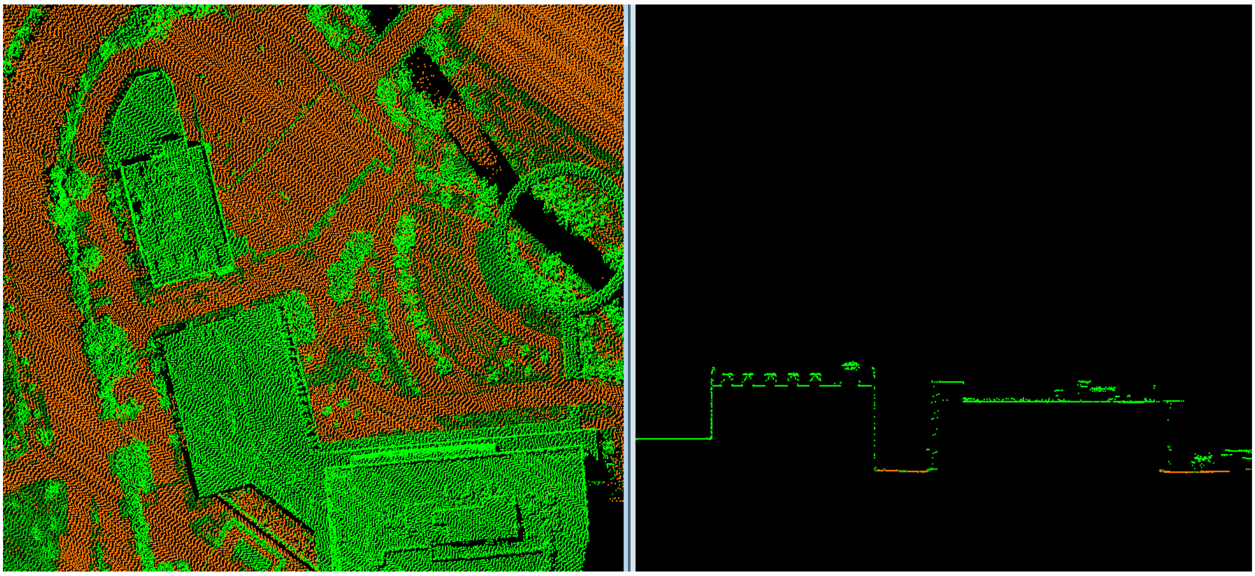


Figure 42: Geo Referenced Point Cloud with cross-sectional view

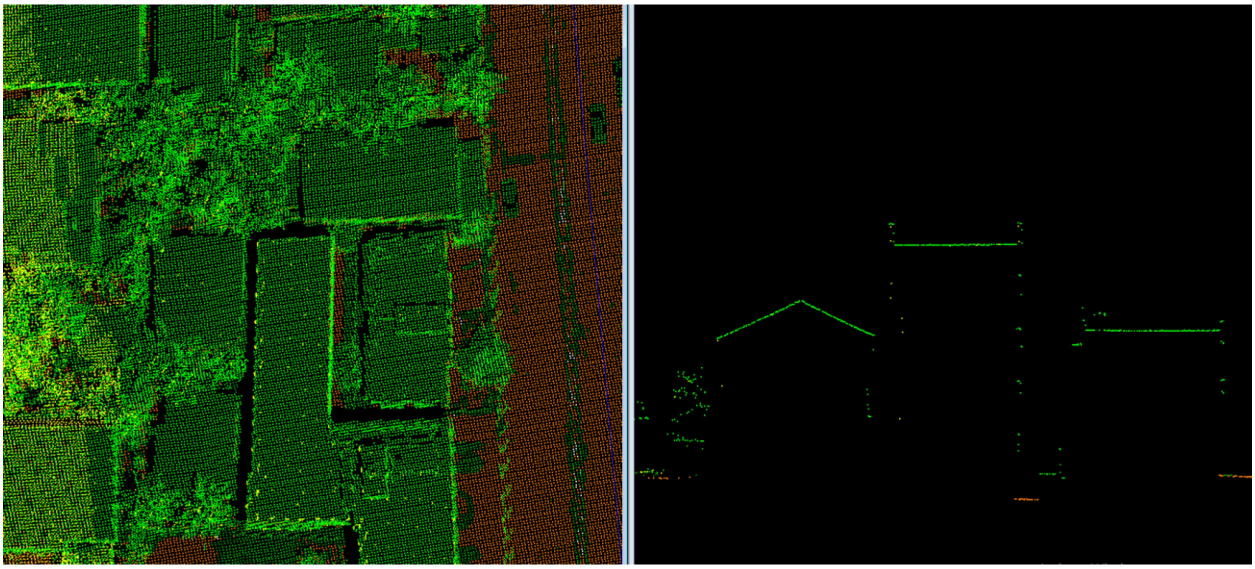


Figure 43: Geo Referenced Point Cloud with cross-sectional view

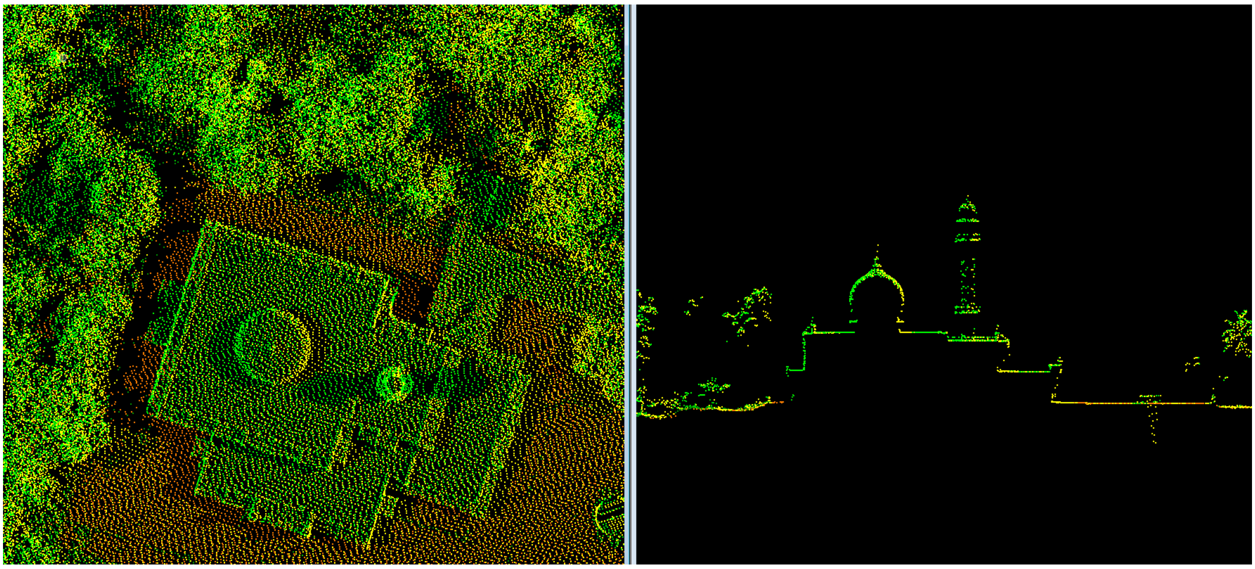


Figure 44: Geo Referenced Point Cloud with cross-sectional view

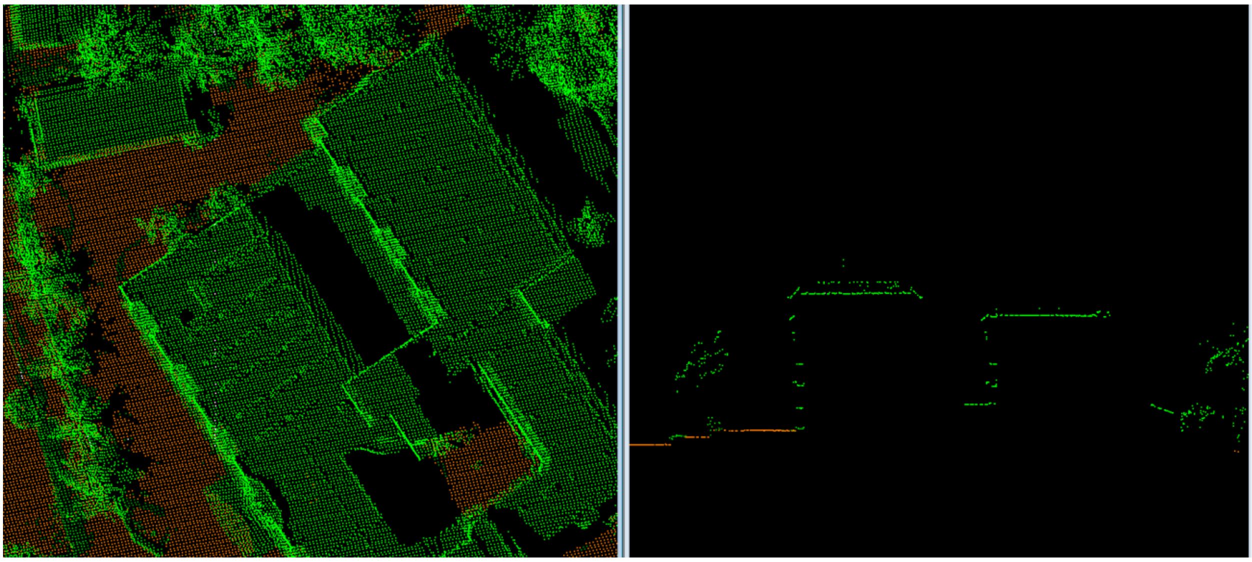


Figure 45: Geo Referenced Point Cloud with cross-sectional view

8.1.8 SECURITY VETTING OF AERIAL LIDAR DATA

Security Vetting is an event in which the Aerial LiDAR Data Captured were vetted by the Survey of India along with the Ministry of Defence and other Nodal agencies from DGCA in the presence of the Security officer. The Security Vetting for Project was held at **Survey of India, Western Printing Groups, Palam Village Road, Near Railway Crossing, Delhi Cantonment** from 31st January 2020 to 4th January 2020**.** The Security Vetting of data was successfully completed and as an acknowledgement of it a Post security vetting letter was issued from Survey of India. Afterwards the security officer handed over the vetted Aerial LiDAR Data to M/s. Geokno India Private Limited.

8.2 DATA CLASSIFICATION AND EDITING

In this project after calibration, the data is cut into 1000 Meter by 1000 meter tiles as per the project specifications, and ground classification macros are applied. Then non ground points are manually or automatically classified to its appropriate classes as specified/required in that project. The classification of points (ground, water, and non-ground features) is determined based on a combination of factors in the data: **point density, voids in data returns, and flatness of the surface**. Additional information, such as publically available imagery, Ortho photos, images taken during data capturing, etc… is used as an additional aid in decision making.

8.3 QUALITATIVE ANALYSIS AND ASSESSMENT

In some cases, automated ground point classification erroneously included known vegetation (i.e., understory, low/dense shrubs, etc.). These points were manually reclassified as non-grounds. Then this data is reviewed by experienced LiDAR analysts, on a tile by tile basis, and ground and non-ground classifications are manually corrected, as needed. After completing 1st QC, the marked errors were corrected using experienced LiDAR analysts. Surface models were generated with the help of classified ground (DEM & DTM) and non-ground (DSM) points. The generated bare earth (ground) model was visually inspected and additional ground point modelling was performed in site- specific areas to improve the ground details. This manual editing of grounds often occurs in areas with known ground modelling deficiencies, such as: bedrock outcrops, cliffs, deeply incised stream banks, and dense vegetation. Thereafter second round of QC is performed by our most experienced analysts, which sometimes involves minor edits to the point classifications.

8.4 DERIVATIVE LIDAR PRODUCTS

8.4.1 MODEL KEY POINTS

A model key point is a point that is flagged to always be retained in a model during thinning processes. From Ground points, the points which are free from noise are flagged as model key points. These flagged points are used to generate contours.

8.4.2 BARE-EARTH LIDAR

The laser pulses emitted from airborne LiDAR systems may be reflected from man-made structures, vegetation, or the earthen surface. A single pulse may reflect from upper, middle, and lower tree canopy as well as the ground beneath, resulting in multiple measurable returns from that pulse. The elevation of the reflected surface(s) is derived based on the amount of time it takes for an emitted pulse to return to the sensor, sensor position, and other parameters.

8.4.3 FIRST RETURN LIDAR

First return should be always from the top of the features like building top, top of the tree canopy/vegetation, electric poles and from the ground the ground if only one pulse is returned to the sensor. DSMs produced by interpolation from first-returns detected from each laser pulse.

8.4.4 LAST RETURN LIDAR

Last return may be from the ground or even from the trunk of a tree depending upon the vicinity of the sensor. DEM is generated by interpolation from LiDAR points classified as ground which may be the last return of the single laser pulse.

8.4.5 SURVEY VERTICAL ACCURACY CHECK POINTS

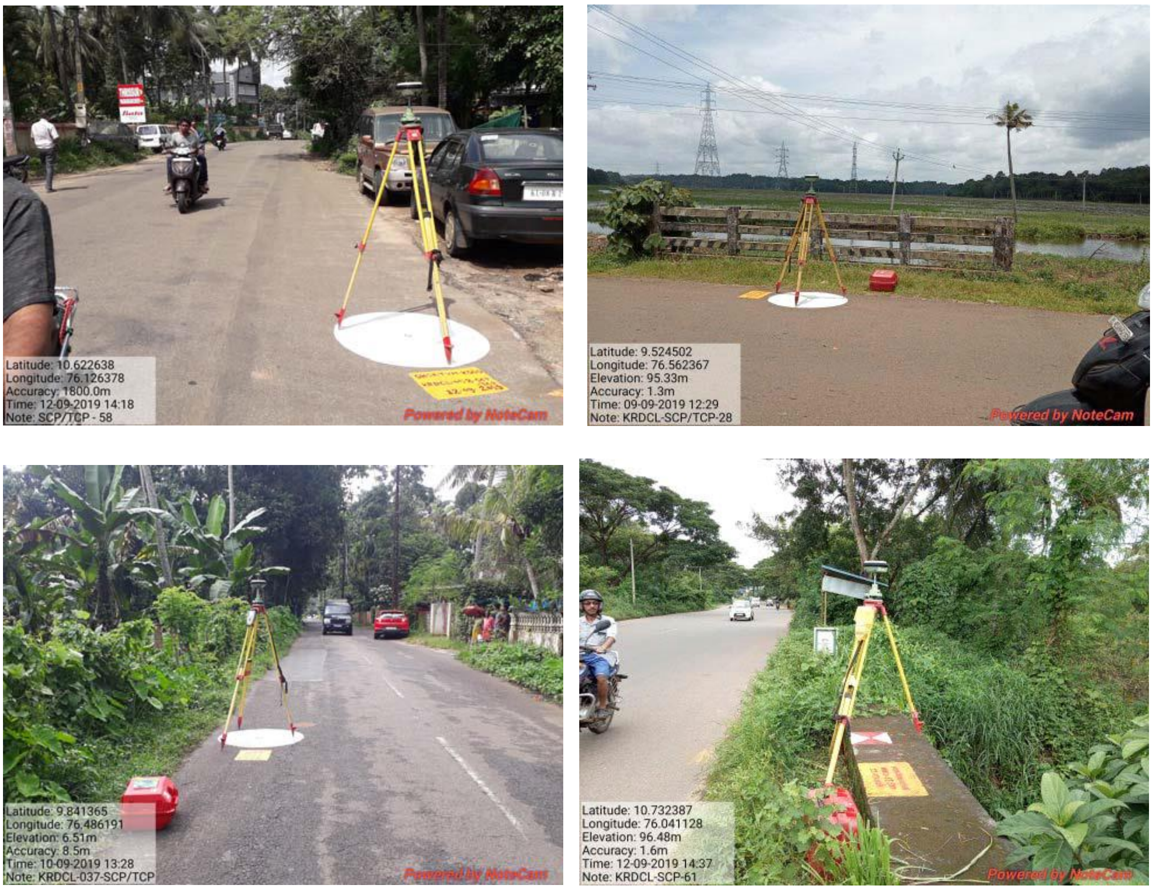


Figure 46:Survey Vertical Accuracy Check points

8.5 AERIAL LIDAR POST PROCESSING

From Georeferenced Aerial LiDAR point cloud, the real world features are manually or automatically extracted. Feature extraction and classification is determined based on a combination of factors in the LiDAR data: point density, voids in data returns, and flatness of the surface. Additional information, such as Ortho photographs taken during data capturing, etc., is used as an additional input in feature extraction. At the end of the LiDAR post processing, all the outputs were extracted from the LiDAR point cloud data, with required spatial accuracy as per project scope. The process on which products derived from Aerial LiDAR survey data can be summarized as follows:

- Pre-processed data in projected UTM projection system (UTM 43N) were imported into appropriate Post processing software.
- Terra solid suits were used to classify the point-cloud data into various classes as per RFP (ASPRS Standards).
- Digital Elevation Model were prepared from the LiDAR classified point cloud, as classified as “Ground only”. This process employees Point to Tin and Tin to Raster.
- Contouring is achieved through the use of established processing techniques in Terra modeller software.

- Ortho Photographs are generated using Terra photo and Leica Photogrammetric suit software's.
- Topographic mapping details were extracted using classified LiDAR data and Ortho photographs using standard mapping software and procedures.

8.5.1 UNCLASSIFIED POINT CLOUD

The spatially corrected Aerial LiDAR data which includes all returns were recorded in a single class called Unclassified LiDAR data. This data was divided into 1km by 1km tiles.

Description	**Specification**
Point Density	More than 10 points per square metre
Coordinate System	UTM 43N, WGS 84
Vertical Datum	MSL

Table 18: Unclassified Point Cloud Specification

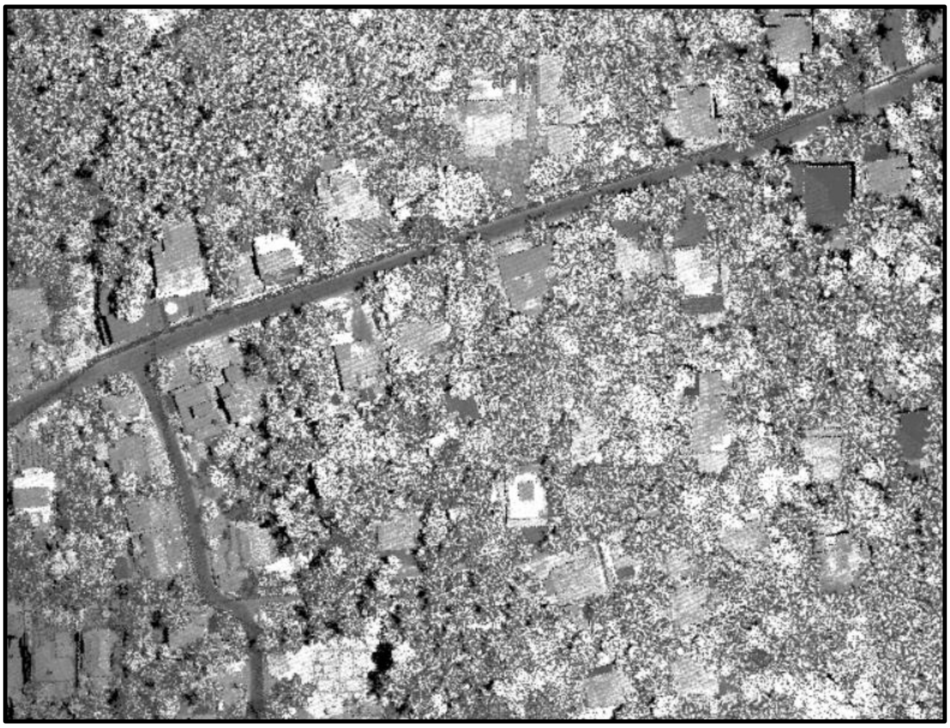


Figure 47: Unclassified Point Cloud

8.5.2 CLASSIFIED POINT CLOUD

Due to the multiple returns that are the result of LiDAR data collection, each point in a point cloud can represent one of many features including ground surface, low vegetation, high vegetation and buildings/infrastructure. For viewing aid, it is important to classify the points based on its feature type. For this project a macro was designed for the purpose of distinguishing between the mentioned features but specifically targeted the creation of a good

DEM layer. The macro that was designed initially reclassified all points into a default class. The steps to follow are as described below;

- Points were classified into the isolation category. A point was considered isolated if there were 3 or less points within 1.2 m of any point. If this was true, the point was moved from the default layer to the low point layers.
- Points were classified into the low point category. A point was considered low if it was 0.5 m below the points within a 3 m radius. This was done for a group of points numbering 6 or less. These points were reclassified into the low point layer. This was run again using the single point numbering option using 0.3m and a 3 m radius.
- Next the ground points were determined. All future point reclassification relies on a defined ground class. The ground class was run twice to try to capture points from different types of terrain. In the first ground reclassification a point was reclassified if it had a max building size of 60, a terrain angle of 88, iteration angle of 6, iteration distance of 1.4. Other settings were left as default. The second round of reclassified ground points were done using a building size of 60, terrain angle of 60, iteration angle of 6 and an iteration distance of 1.2. This was an attempt to improve the accuracy of the ground points in very flat areas.
- Next height above ground from 0.3 to 200 meters was classified as default. This was to minimize the data reduction from isolation and low point routines in the vegetation foliage.
- Not all ground points were included in the original ground file. We ran a height above ground from -0.15 to 0.25 on the low point classification and re-classified all points in that zone as ground points. Additionally, we classified all default points from 0-0.3m as ground points as well. This helped the most in areas with very low point density.
- Removed below ground points with a standard deviation of 3 and z-tolerance of 0.
- Classified Low, Medium and High vegetation using the height above ground tool. Low vegetation was considered 0.25 to 1m, medium vegetation 1-2m and high vegetation 2-200m.
- Finally, the building routine was run moving points from high vegetation to building using a building size of 40 and a z-tolerance of 0.5.
-

The delivered classified point cloud is classified as per following RFP (ASPRS Standards).

S.NO	POINT CLASS	DESCRIPTION
0	Unclassified	Created, never classified
1	Default	Unclassified
2	Ground	Bare ground
3	Low vegetation	0-0.3m(essentially sensor noise)
4	Medium vegetation	0.3-2m
5	High vegetation	2m>
6	Building Structure	Buildings, houses, sheds, soils etc.
7	Low/High points	Spurious high/low point return

8	Model key points	Reserved for 'model key points' only
9	Water	Any point in water
10	Bridge	Any bridge or overpass
11	Not used	Reserved for future definition
12	Overlap points	Flight line overlap points
13-31	Not used	Reserved for future definition

Table 19: Point Class Table

DESCRIPTION	SPECIFICATION
Point Density	More than 10 points per square metre
Coordinate System	UTM 43N, WGS 84
Vertical Datum	MSL

Table 20: Classified Point Cloud Specification

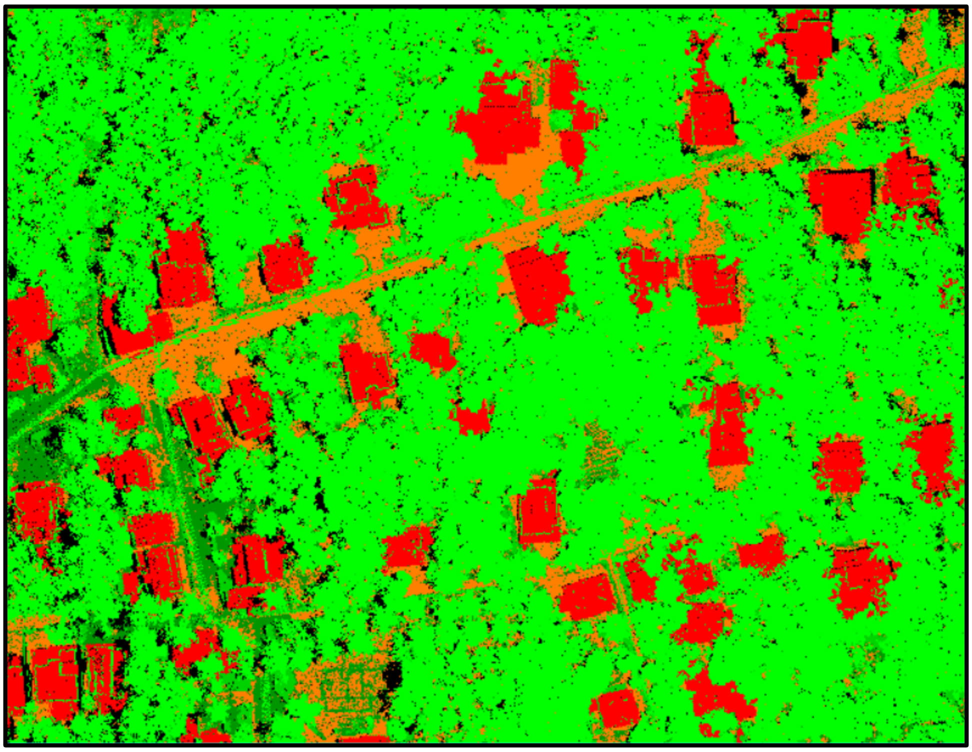


Figure 48: Classified Point Cloud

8.5.3 DIGITAL ELEVATION MODEL (DEM)

8.5.3.1 DEM PRODUCTION METHODOLOGY

Digital Elevation Model is generated from the LiDAR mass point data classified as "ground only", hence it defines the" bare earth" ground surface. DEM generation employed a Point to TIN and TIN to Raster process with Natural Nearest Neighbour Interpolation. Hydro flattening has been done for natural and man-made water bodies and water courses as defined in RFP. Void areas are coded using a unique "NO DATA" value. The delivered DSM were in ESRI Floating point grid format and it is in 1km*1km tiles with 1 m grid interval.

DESCRIPTION	SPECIFICATION
Grid Interval	1 m
Coordinate System	UTM 43N, WGS 84
Vertical Datum	MSL

Table 21: Digital Elevation Model specification

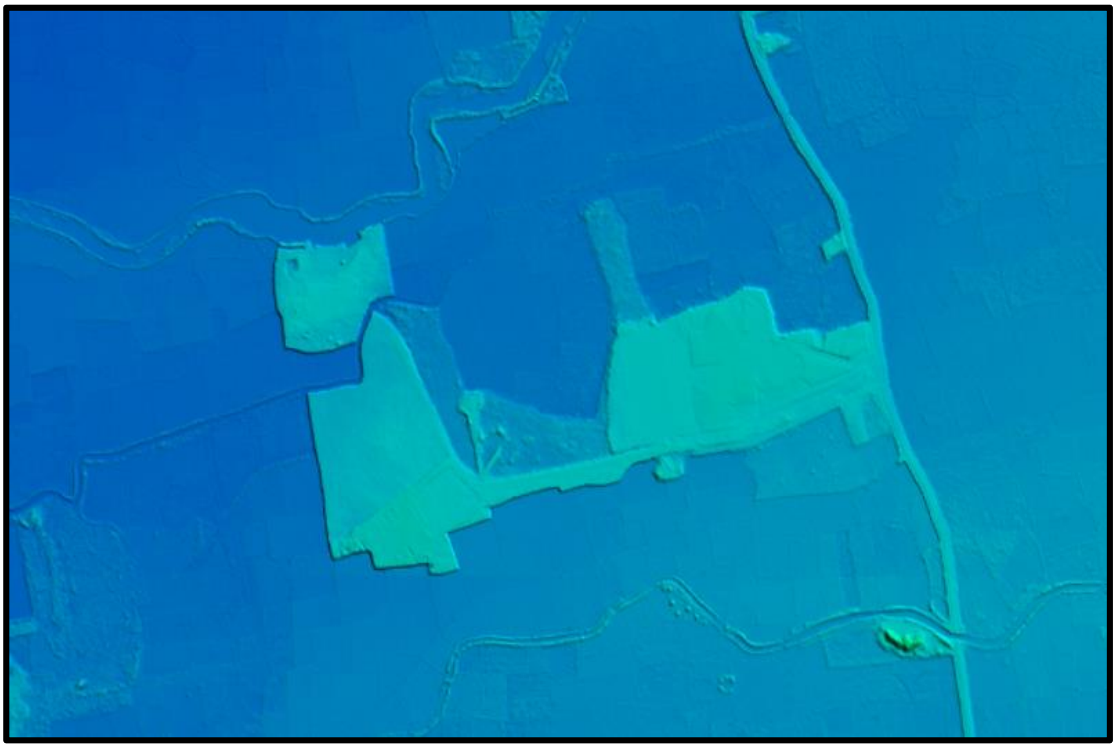


Figure 49: Digital Elevation Model

8.5.3.2 DEM QUALITATIVE ASSESSMENT

From the classified ground points, TIN is generated from the point cloud through automation process in Terra Model. TIN will be in the form of irregular triangles connecting points at specified intervals. Rather upon checking with the control points, there may be discrepancies in the TIN. Usually at some areas, the network doesn't represent the real terrain due to undulations. Breaklines and Hydro flattening techniques are used to eliminate those discrepancies in the TIN. Breaklines differentiate the network with original elevation by draping a line. Hydro Flattening is a method to drape the elevation on the water bodies which is identified from the point cloud generally as a void in the dataset.

8.5.3.3 DEM VERTICAL ACCURACY RESULTS

Geokno Obtained the vertical accuracy of 1 meter which is in line with the project specification of 1 meter.

8.5.3.4 DEM QA/QC CHECKLIST

S. NO	LIST OF PARTICULARS	REMARKS	
		YES	NO
1.	Checked whether the given study area was covered with DEM, DTM & DSM	✓	
2.	DEM & DSM Resolution is 1m. Statistical testing had been done	✓	
3.	Visual testing had been done	✓	
4.	DEM (max & min elevation) had been compared with contour (max & min elevation)	✓	
5.	Slope testing had been done	✓	
6.	Edge matching had been done	✓	
7.	Classification error testing had been done	✓	
8.	Checked for Ground Spikes	✓	
9.	Hydro-flattening had been done as per RFP Specifications	✓	

Table 22: DEM QA/QC Checklist

8.5.4 CONTOUR MAPS

A TIN model is generated from DEM grid data and Break line using Terra Model applications and in-house developed tools. Following are the steps used to edit the contour files and to create the final files.

- The DTM data, mass points and break lines which are classified from LiDAR data were imported into the Terra Model environment to generate the TIN.
- The contour generation tools with the various parameters were used to generate the contours as per specified intervals.
- Generated Contours were thoroughly checked and corrected to adhere contour topological standards.
- Major and Minors contours are properly layered and their elevations were labelled.
- The delivered contours were free from any topological errors such as spikes, crossings, etc.
- The contours are generated according to a layering schema that fits the Database Dictionary and the Data Model so that the conversion to Shape files (or any other GIS Format) takes place smoothly and accurately.

DESCRIPTION	SPECIFICATION
Grid Interval	0.5 m
Coordinate System	UTM 43N, WGS 84
Vertical Datum	MSL
Format	Auto Cad Drawing

Table 23: Contour Specification

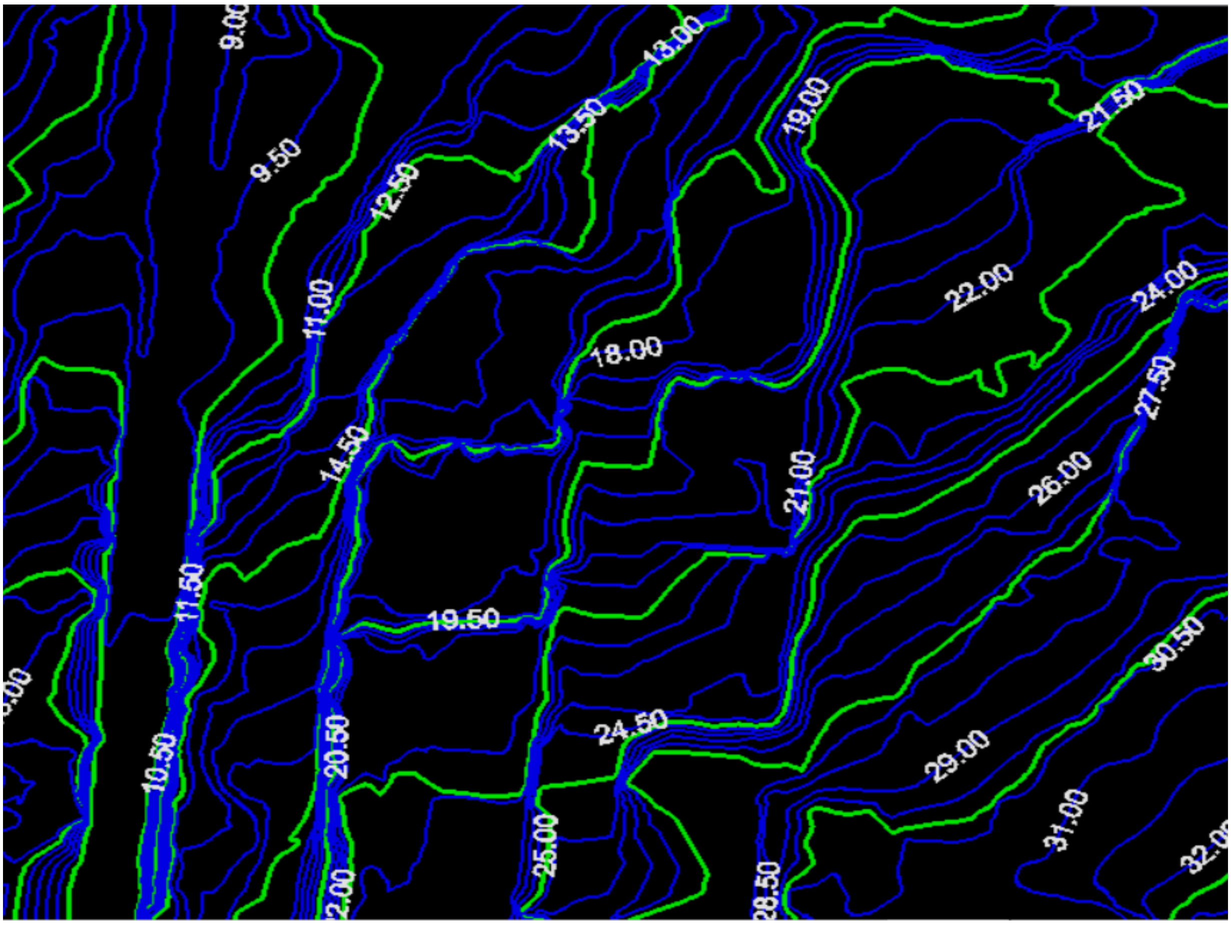


Figure 50: Contour Map

8.5.5 DIGITAL SURFACE MODEL (DSM)

Digital surface Model will be generated from the “first return” LiDAR points. This data included ground and non-ground points such as vegetation, buildings. Technically, it resembles the elevation of the top most feature of the earth surface. DSM generation employed a Point to TIN and TIN to Raster process with Natural Nearest Neighbour Interpolation. Void areas are coded using a unique “NO DATA” value. The DSM will be generated in ESRI Floating point grid format and it will be in 1km*1km tiles with 1 m grid interval.

DESCRIPTION	SPECIFICATION
Grid Interval	1 m
Coordinate System	UTM 43N, WGS 84
Vertical Datum	MSL

Table 24: Digital Surface Model specification

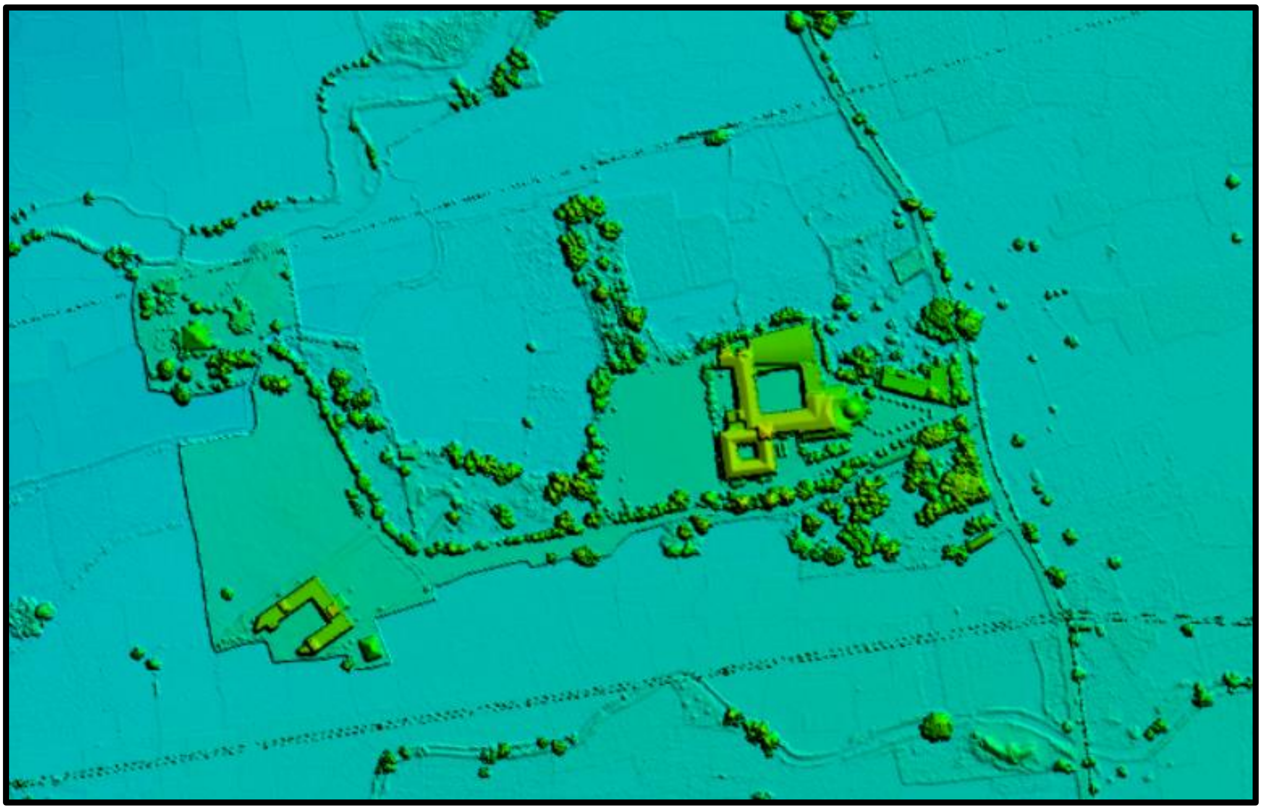


Figure 51 Digital Surface Model

8.5.6 DIGITAL TERRAIN MODEL (DTM)

A digital elevation model is a 3D representation of the terrain elevations found on the earth’s surface. DEMs are generated from variably-spaced Lidar ground points, or they can be created using a raster grid. A Digital Terrain Model (DTM) is a DEM in which terrain data has been further enhanced with break lines, creating greater accuracy as it contains additional information defining terrain.

Description	**Specification**
Grid Interval	1 m
Coordinate System	UTM 43N, WGS 84
Vertical Datum	MSL

Table 25: Digital Terrain Model Specification

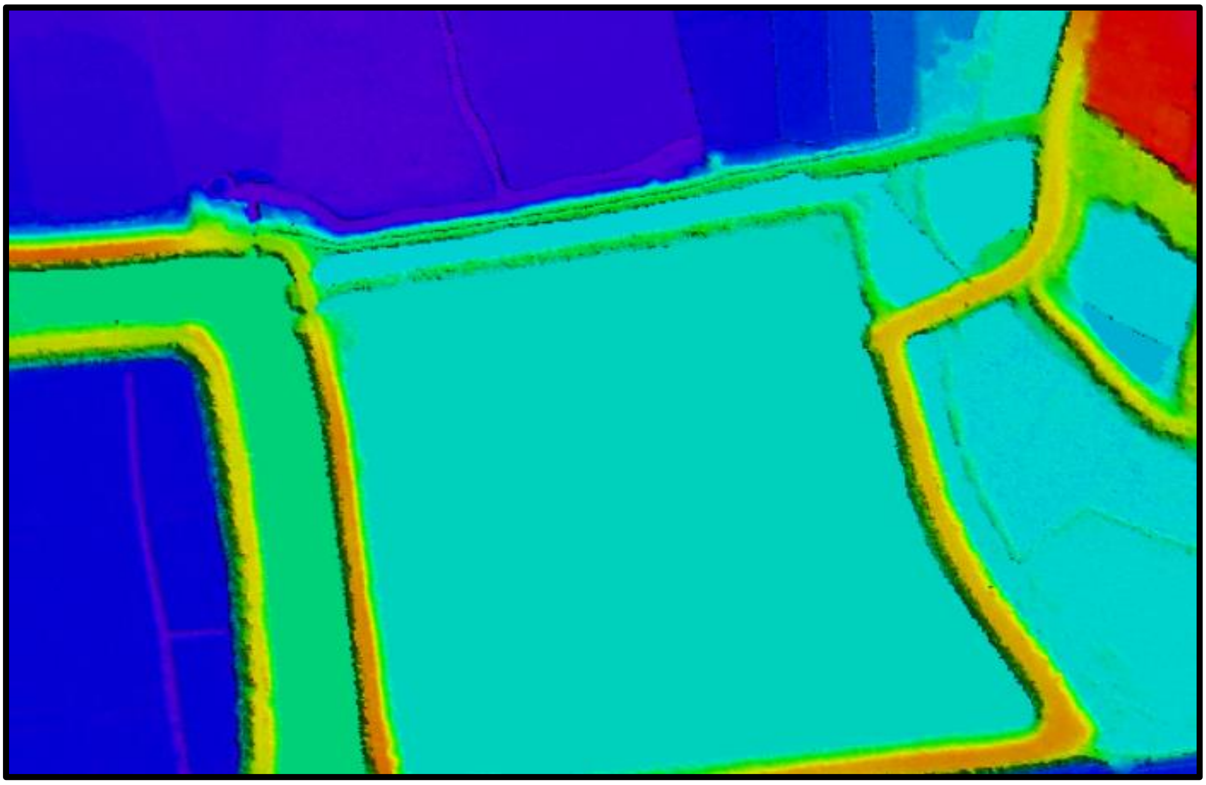


Figure 52: Digital Terrain Model

8.5.7 BREAK LINE PRODUCTION & QUALITATIVE ASSESMENT REPORT

A break line is a three-dimensional line in a digital mapping environment used to represent a sudden or abrupt change or break in the terrain's smoothness. Break lines will be created for the following features:

Streams and Rivers: The banks or land/water interface shall be depicted for all linear hydrographic features. Islands will be excluded as "holes" in the Streams and Rivers features. Each vertex placed needs to maintain vertical integrity, including monotonicity and connectivity. Exemptions to monotonicity may occur due to complex branch networks.

Ponds and Lakes: The land/water interface is depicted for all water bodies, such as lakes, ponds, and reservoirs, at a constant elevation. Every vertex on each feature must be placed at the same elevation and all elevation is set at or slightly below the surrounding terrain. Islands will be excluded as "holes" in the Ponds and Lakes features.

Hydro Flattened DEM Production: The processed and classified LiDAR point cloud may be used to create Digital Elevation Models. Bare-earth DEMs with 1- meter pixel resolution will be created for the project.

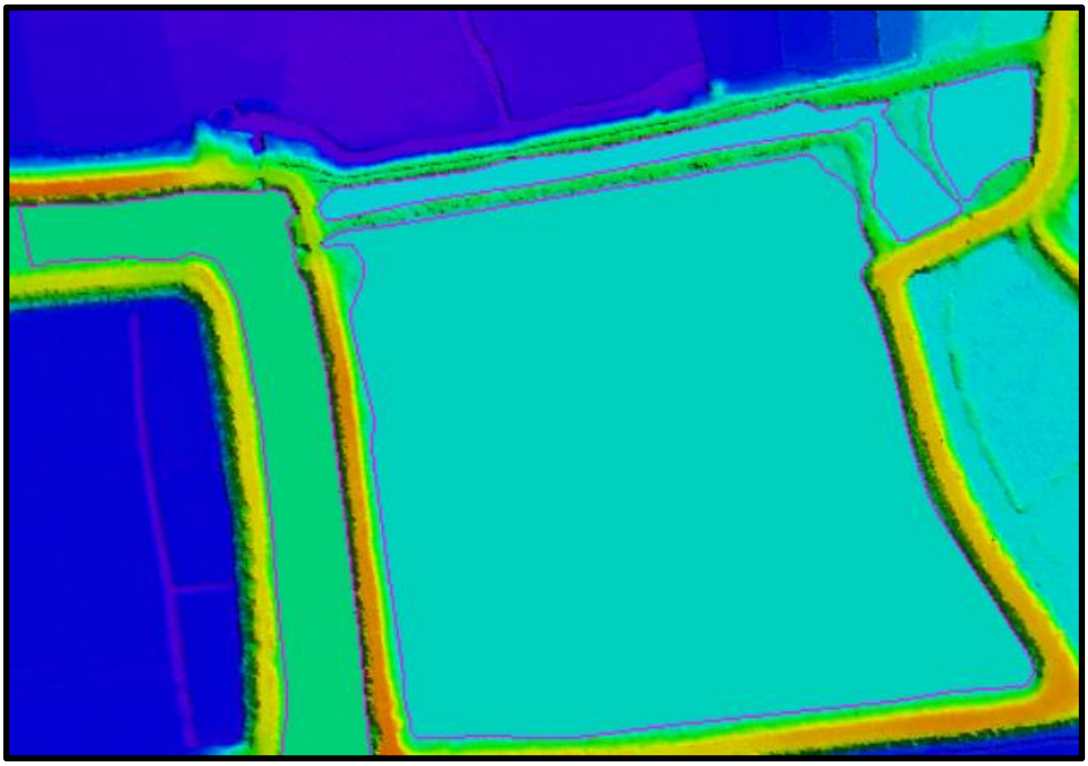


Figure 53: Breaklines

8.5.7.1 BREAK LINE PRODUCTION METHODOLOGY

A break line is a vector-based feature (polyline, polygon) added to a 3D model. The surface model is generally a Triangulated Irregular Network (TIN), although this is not strictly a requirement. A point cloud comprises discrete points with voids in between the points.

To visualize the point cloud as a surface, we need to “fill in” the space between the points. One of the most common ways of doing this in a Geospatial Information System (GIS) is to connect each point in a triangle mesh. We do this in a very special way to maximize the interior angles of all of the triangles. The three important elements of a TIN are:

- Node – The points used to construct the TIN
- Edge – The line segment that connects two nodes
- Facet or Face – The triangle formed by three edges.

Thus, we have formed a Triangulated (comprising triangles), (I)regular (the triangles are, in general, different sizes and contain differing angles), Network (we can traverse the entire mesh by following edges). When the faces are “filled”, we have a 3D solid model. So hopefully it is apparent that the TIN is a way of interpolating data (estimated values between our actual sample points) as well as a graphical visualization tool.

The TIN is one of the most flexible representations of a point surface because, like a three-legged stool, the faces will always perfectly fit the elevation points of the original point cloud. The disadvantage of a TIN is that it has sharp edges and hence is very course in appearance when zoomed in (a TIN is a first order approximation to a surface).

Breaklines are two or three dimensional features (generally polylines or polygons) introduced into the TIN to constrain the generation of surface models. These introduced Breaklines may be developed such that they do not modify the original surface geometry. Breaklines can be stored as ancillary feature data that are dynamically added to the model when needed (during surface generation or derived product creation).

Breaklines introduced into a surface such that none of the existing TIN elevations are modified are termed "soft." These Breaklines are used to preserve original elevations in a model or to indicate a feature in the TIN such as the edge of a road. Each of these nodes will take on a Z value identical to the elevation of the intersected triangle edge. This operation is termed a “pure drape.” This is quite a visual term, as you can see how the line has been “draped” over the TIN. Note that since we have not yet “enforced” this break line, the triangles intersected by the line segment have not been modified. That is, a new node (also referred to as a vertex) is created at each point where one of the introduced lines crosses an edge of the original TIN.

8.5.7.2 BREAK LINE QUALITATIVE ASSESSMENT

This new model will very closely resemble the original model since we have not introduced any new elevation points. However, there are subtle differences because enforcing the break line introduces a new triangle vertex at each point where the line crosses the original TIN. This break line enforcement forces the new TIN to violate the previously mentioned Delaunay criteria, because it forces triangle edges to be inserted along the break line.

Note that even though these Breaklines do not introduce any changes in terms of elevation points, the change in the triangulation can cause very subtle changes in the elevation models that will be derived from the TIN. In most cases, the changes in contours introduced with Breaklines will be very small.

8.5.7.3 BREAK LINE TOPOLOGY RULES

Breaklines generally serve one of two functions (or sometimes both). They preserve the topography as subsequent operations are performed. For example, withholding some of the ground points after introducing the Breaklines of our example (most typically in a data thinning operation) can dramatically change the morphology in the neighborhood of the break line, but it will not change right at the line.

A second reason for introducing Breaklines is for feature coding operations. Sometimes the facets of triangles are labeled with a feature class such as “Ground” or “Road.” Introducing a break line allows one to split features, such as the Ground into two features (Ground, Road).

8.5.7.4 BREAK LINE QA/QC CHECKLIST

S. NO	LIST OF PARTICULARS	REMARKS	
		YES	NO
1	Checked whether the given study area was covered completely with break line	✓	
2	Checked whether any object was missed during feature extraction	✓	
3	Checked whether the extracted objects contain any XY problems	✓	
4	Checked whether delivered parts are matched	✓	
5	Checked the overall interpretation error	✓	
6	Checked for elevation Spikes	✓	

Table 26: Break line QA/QC Checklist

8.5.8 INTENSITY IMAGERY

Intensity is a measure, collected for every point, of the return strength of the laser pulse that generated the point. It is based, in part, on the reflectivity of the object struck by the laser pulse. The strength of the returns varies with the composition of the surface object reflecting the return. Intensity is used as an aid in feature detection and extraction, in LiDAR point classification, and as a substitute for aerial imagery when none is available. Intensity is relative, not quantifiable, therefore you cannot expect the same value off the same target from flight to flight or from elevation to elevation.

LiDAR intensity is recorded as the return strength of a laser beam. In the Geo-MMS LiDAR systems, it is a bi-product, provided as an integer number between 1-256. This number varies with the composition of the surface object reflecting the laser beam. A low number indicates low reflectivity while a high number indicates high reflectivity. The intensity of the laser beam return can also be affected by the angle of arrival (scan angle), range, surface composition, roughness, and moisture content.

The first basic application is the simple visualization of the acquired data. The intensity-based approach was then extended to identify common features between multiple scans, resulting in new algorithms for matching and registration of point clouds. Such approaches include scan-to-scan or image-to-scan registration.

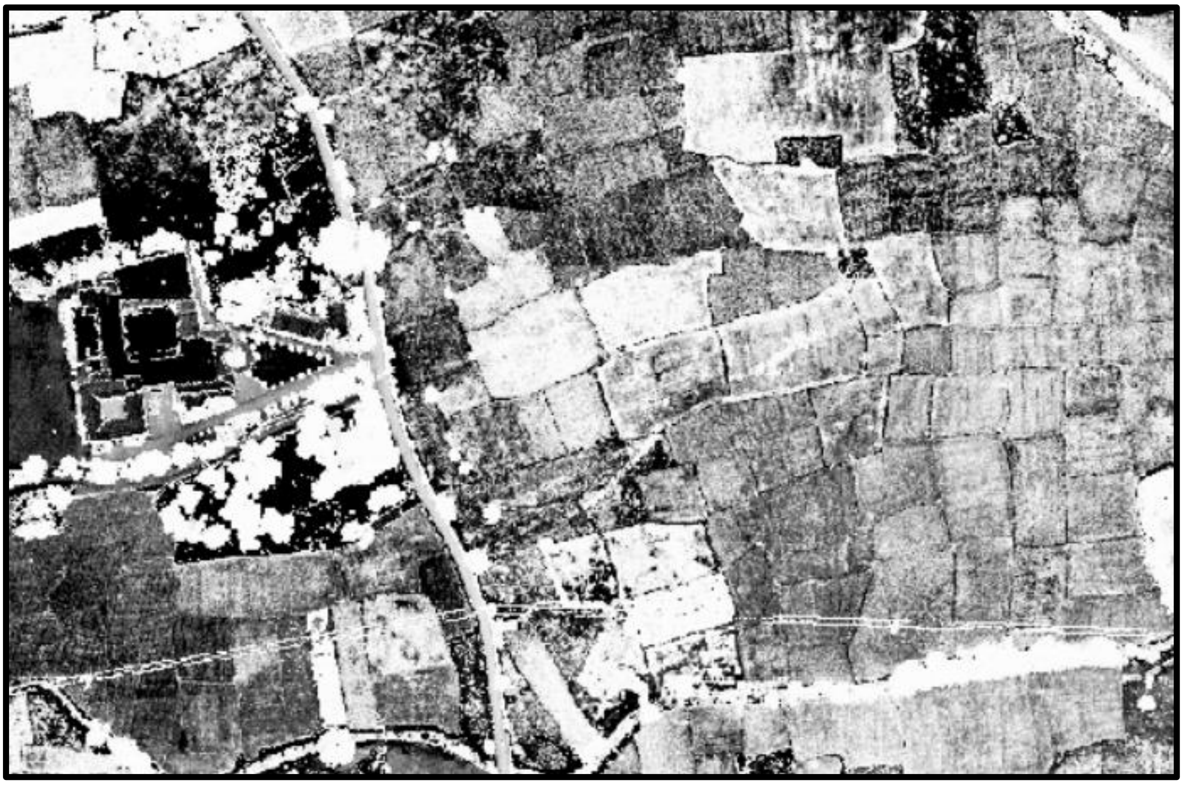


Figure 54: Intensity Imagery

8.5.9 ORTHO PHOTOGRAPHS GENERATION

Geokno will use the mature, stable, and thoroughly tested technologies and proven QA/QC procedures for Ortho Photographs production. Some key points regarding the team's approach include:

- Radiometric correction algorithms and routines to process large amounts of data with efficiency and extremely high levels of quality and accuracy.
- Large amounts of available production capacity to ensure rapid response.
- Effective quality control and quality assurance routines to ensure first-time-right delivery.

The Ortho Photographs rectification process is to correct all the distortions due to the aerial acquisition (using the AT result) and the variations of the ground surface (using the final DTM). The production of the Ortho Photographs will follow two steps:

- pre-processing at low resolution creating a reference quick look
- Finalization at full resolution Ortho rectified photographs.

Ortho Rectification & Mosaicing

All the images will be properly stitched with well distributed manual and automatic tie points. Every blocks were thoroughly inspected to ensure all the tie points will be measured at necessary locations before performing bundle block adjustments.

All the images were properly stitched with well distributed manual and automatic tie points. Every blocks were thoroughly inspected to ensure all the tie points were measured at necessary locations before performing bundle block adjustments. The Digital Elevation data is used to rectify Ortho Photographs using

Terra photo software. The rectification process is used the Cubic convolution resampling technique to ensure high accuracy and image quality. Seamlines are automatically generated, but they are manually verified and edited before using them in the Mosaicing process. Mosaiced Ortho photographs were exported into blocks which were 1km X 1km, then all the necessary colour corrections were carried out. This colour correction process includes removing of scratches, static marks, any noticeable blemishes and any defects caused due to out of focus. Final Ortho photographs were radiometrically and geometrically corrected to ensure consistency with adjacent files without obvious distinction between them. Finally, mosaicked Ortho photographs were divided into 1km tiles in Geotiff format. The Ortho Photographs are produced at 10 cm GSD.

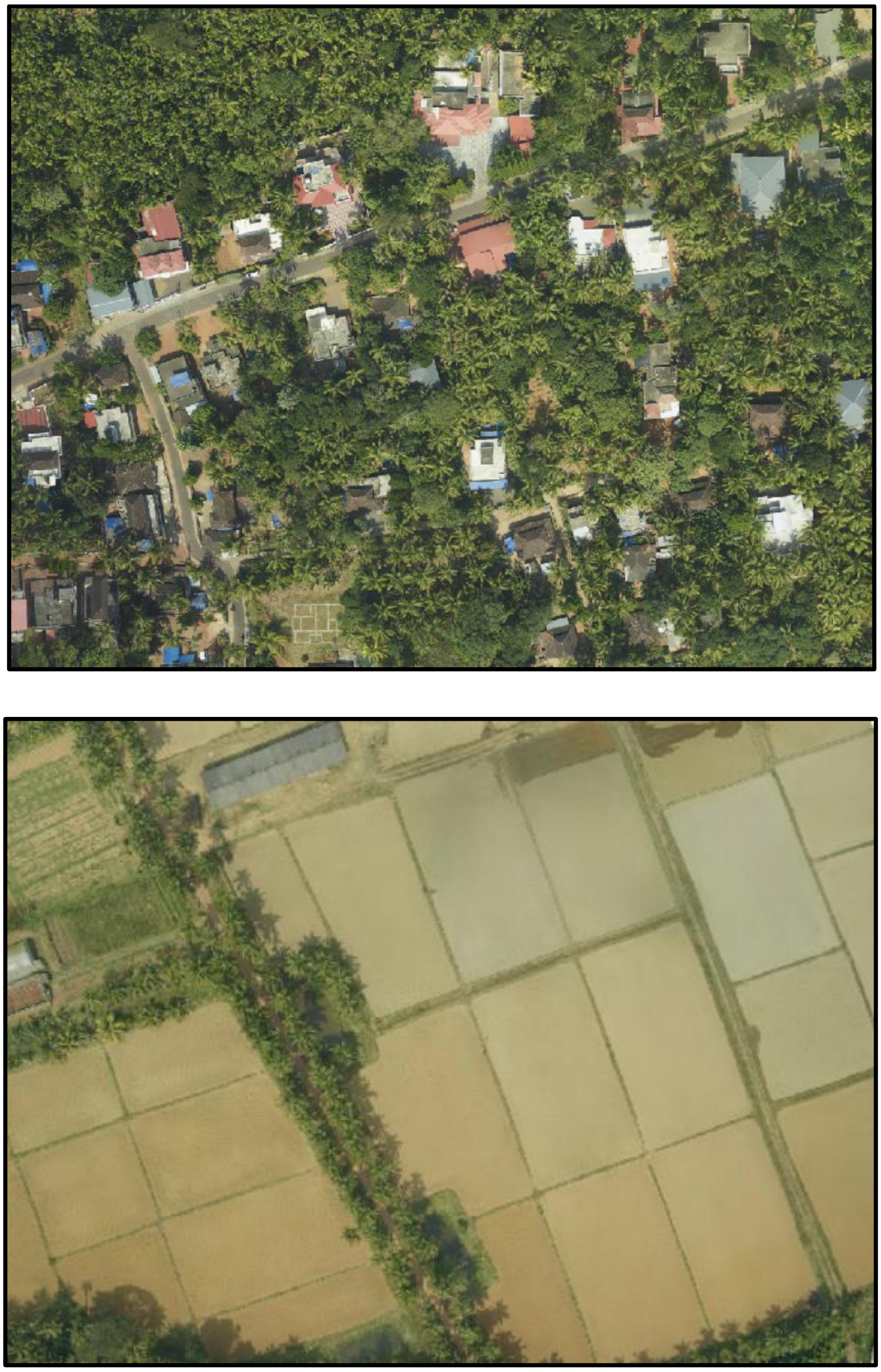


Figure 55: Ortho Photograph

8.5.10 TOPOGRAPHICAL MAP

Generally, Feature Extraction is the process of obtaining the desirable and required information from the raw data. There is lot of techniques used to extracting the features. For example, buildings are extracted by viewing the top and side view of the point cloud, but poles and trees are extracted by viewing multiple cut sections.

The feature extraction from point cloud is determined based on a combination of factors in the data: point density, voids in data returns, and flatness of the surface. Additional information, such as publically available imagery, Ortho photos, images taken during data capturing, etc.… is used as an additional aid in decision making. Likewise, different techniques and factors are used to extract required features from the point cloud data to different layers. The final Topographic map was prepared after proper topology checking and QA/QC procedure.

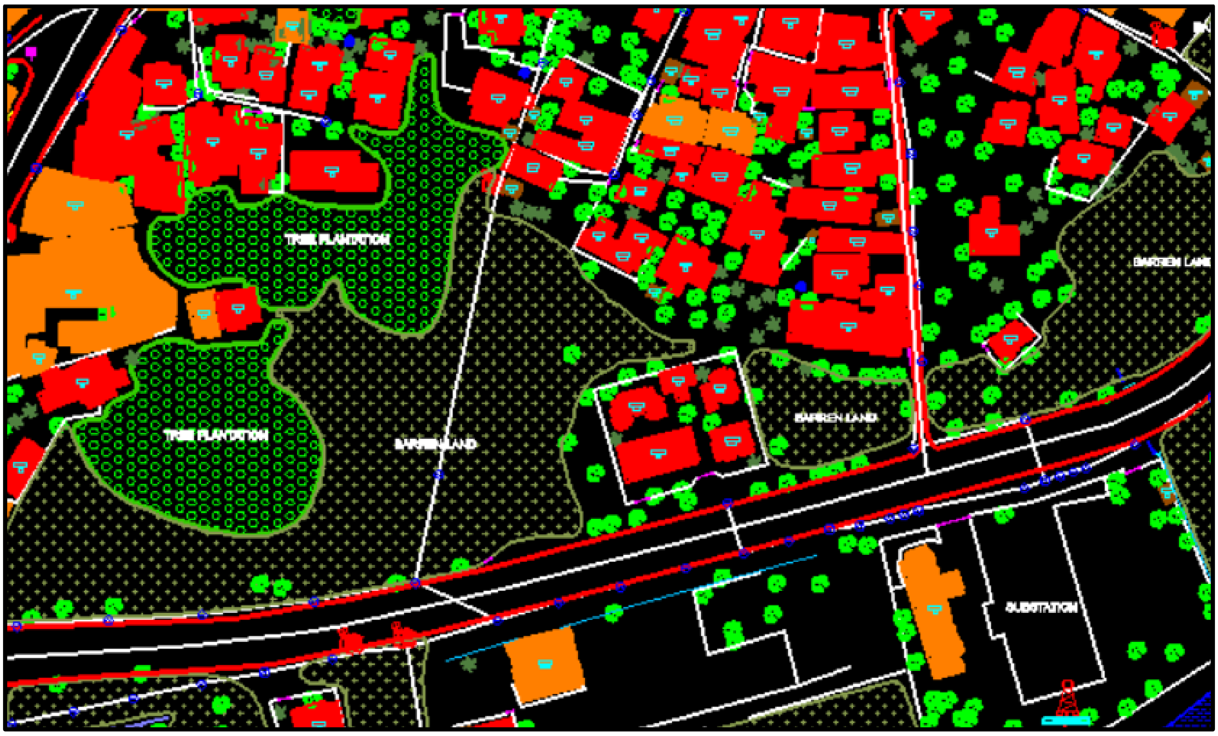


Figure 56: Topographical Map

8.5.11 DATA DICTIONARY

8.5.11.1 HORIZONTAL AND VERTICAL DATUM

The horizontal datum referenced to the World Geodetic System of 1984 (WGS84), Units in meters. Earth Gravitational Model 2008 (EGM2008) is used to convert ellipsoidal heights to Orthometric heights. The vertical datum referenced to the Survey of India Vertical Datum (MSL).

8.5.11.2 COORDINATE SYSTEM AND PROJECTION

All data are projected to UTM Zone 43N, Horizontal Units in meters and Vertical Units in meters.

8.5.11.3 INLAND STREAMS AND RIVERS

Feature Dataset	BREAK LINES	**Feature Class**	STREAMS AND RIVERS
Feature Type	Polygon	**Annotation Subclass**	None
Contains M Values	No	**Contains Z values**	Yes
XY Resolution	Accept default setting	**Z Resolution**	Accept default setting
XY tolerance	0.003	**Z tolerance**	0.001

8.5.11.3.1 DESCRIPTION

This polygon feature class depict linear hydrographic features with width greater than 5 meter.

8.5.11.3.2 TABLE DEFINITION

FIELD NAME	DATA TYPE	ALLOW NULL VALUES	DEFA-ULT VAUE	DOMA-IN	PRECI-SION	SC-ALE	LEN-GTH	RESPONSIBILITY
OBJECT_ID	Object ID							Assigned by Software
SHAPE	Geometry							Assigned by Software
SHAPE_LENGTH	Double	YES			0	0		Calculated by Software
SHAPE_AREA	Double	YES			0	0		Calculated by Software

Table 27: Streams and rivers table definition

8.5.11.3.3 FEATURE DEFINITION

DESCRIPTION	DEFINITION	CAPTURE RULES
STREAMS AND RIVERS	Linear hydrographic features such as streams, rivers, canals, etc. with an average width greater than 5m in length.	Hydro-flattening is undertaken for natural and manmade water bodies and water courses as defined below: Non-tidal water bodies with a surface area greater (>) than 25m2.Water courses greater than 5m nominal width. Flat and level bank-to-bank with a gradient following the immediate terrain. Water courses will break at road crossings and bridges. The entire water surface edge must be at or immediately below the surrounding terrain. Any additional data layers created for the purposes of hydro-flattening such a masks or break-lines are provided as KMZ/CAD files. Each vertex placed should maintain vertical integrity and data is required to show “closed polygon”. Generally, both banks shall be collected to show consistent downhill flow. There are exceptions to this rule where a small branch or offshoot of the stream or river is present. Islands: In this case, a segmented polygon shall be used around the island in order to allow for the island feature to remain as a “hole” in the feature.

Table 28: Streams and rivers feature definition

8.5.11.4 INLAND PONDS AND LAKES

Feature Dataset	BREAK LINES	**Feature Class**	PONDS_AND_LAKES
Feature Type	Polygon	**Annotation Subclass**	None
Contains M Values	No	**Contains Z values**	Yes
XY Resolution	Accept default setting	**Z Resolution**	Accept default setting
XY tolerance	0.003	**Z tolerance**	0.001

8.5.11.4.1 DESCRIPTION

This polygon feature depicts closed water body feature that are at constant elevation.

8.5.11.4.2 TABLE DEFINITION

FIELD NAME	DATA TYPE	ALLOW NULL VALUES	DEFA-ULT VAUE	DOMA-IN	PRECI-SION	SC-ALE	LEN-GTH	RESPONSIBILITY
OBJECT_ID	Object ID							Assigned by Software
SHAPE	Geometry							Assigned by Software
SHAPE_LENGTH	Double	YES			0	0		Calculated by Software
SHAPE_AREA	Double	YES			0	0		Calculated by Software

Table 29: Ponds and Lakes table definition

8.5.11.4.3 FEATURE DEFINITION

DESCRIPTION	DEFINITION	CAPTURE RULES
PONDS AND LAKES	Land/Water boundaries of constant elevation water bodies such as lakes, reservoirs, ponds, etc. Features shall be defined as closed polygons and contain an elevation value that reflects the best estimate of the water elevation at the time of data capture.	The water interface is depicted for all water bodies, such as lakes, ponds, and reservoirs, at a constant elevation. Every vertex on each feature must be placed at the same elevation and all elevation is set at or slightly below the surrounding terrain. Water bodies shall be captured as closed polygons with the water feature to the right. The compiler shall take care to ensure that the z-value remains consistent for all vertices placed on the water body. Break lines must be captured at or just below the elevations of the immediately surrounding terrain. Under no circumstances should a feature be elevated above the surrounding LiDAR points. Acceptable variance in the negative direction will be defined for each project individually. An Island within a Closed Water Body Feature will also have a “donut polygon” compiled.

Table 30: Ponds and Lakes feature definition

8.5.11.5 TIDAL WATERS

Feature Dataset	BREAK LINES	**Feature Class**	TIDAL_WATERS
Feature Type	Polygon	**Annotation Subclass**	None
Contains M Values	No	**Contains Z values**	Yes
XY Resolution	Accept default setting	**Z Resolution**	Accept default setting
XY tolerance	0.003	**Z tolerance**	0.001

8.5.11.5.1 DESCRIPTION

This polygon feature depicts closed water body feature that are at constant elevation.

8.5.11.5.2 TABLE DEFINITION

FIELD NAME	DATA TYPE	ALLOW NULL VALUES	DEFA-ULT VAUE	DO MA-IN	PRECI-SION	SC-ALE	LEN-GTH	RESPONSIBILITY
OBJECT_ID	Object ID							Assigned by Software
SHAPE	Geometry							Assigned by Software
SHAPE_LENGTH	Double	YES			0	0		Calculated by Software
SHAPE_AREA	Double	YES			0	0		Calculated by Software

Table 31: Tidal Waters table definition

8.5.11.5.3 FEATURE DEFINITION

DESCRIPTION	DEFINITION	CAPTURE RULES
TIDAL WATERS	Tidal water means any part of the sea and any part of a river within the ebb and flow of the tide at ordinary spring tides, and not being a harbor.	Tides are the rise and fall of water levels caused by the combined effects of the gravitational forces exerted by the Moon and the Sun and the rotation of the Earth. The times and amplitude of tides at any given locale are influenced by the alignment of the Sun and Moon, by the pattern of tides in the deep ocean, by the amphidromic systems of the oceans, and the shape of the coastline and near-shore bathymetry. Some shorelines experience a semi-diurnal tide—two nearly

		equal high and low tides each day. Other locations experience a diurnal tide—only one high and low tide each day. A "mixed tide"—two uneven tides a day, or one high and one low—is also possible. Water bodies are captured as closed polygons with the water feature to the right. The compiler shall take care to ensure that the z-value remains consistent for all vertices placed on the water body. Break lines must be captured at or just below the elevations of the immediately surrounding terrain. Under no circumstances should a feature be elevated above the surrounding LiDAR points. Acceptable variance in the negative direction will be defined for each project individually.

Table 32: Tidal Waters feature definition

9 LIDAR HORIZONTAL & VERTICAL ACCURACY STATISTICS & ANALYSIS

9.1 BACKGROUND

In general Horizontal accuracy validation is the process of comparing the Planimetric coordinates points with coordinates of sample points. Spatial accuracy is determined by using root-mean square error (RMSE) to estimate positional accuracy. "RMSE is the square root of the average of the set of squared differences between dataset coordinate values and coordinate values from an independent source of higher accuracy for identical points.

Accuracy generally reported at the 95% confidence level, which means that 95% of the positions in the dataset will have an error with respect to true ground position that is equal to or smaller than the reported accuracy value. The reported accuracy value reflects all uncertainties, including those introduced by geodetic control coordinates, compilation, and final computation of ground coordinate values in the product.

9.2 HORIZONTAL ACCURACY TEST PROCEDURES

The Fundamental Horizontal accuracy is determined by comparing the Ground Control Points collected on Project site. Such **116 numbers of Ground Control Points** are collected in Project area at an interval of every 5 Kms. Each Ground Control Point is a well-defined point, which can be easily identified or extracted in LiDAR data. Ground Control Points are observed using DGPS survey.

9.3 HORIZONTAL ACCURACY TESTING STEPS

The Easting and Northing observed in the field are compared with the Easting and Northing observed from LiDAR data. The comparison results are tabulated and found to be within the project accuracy**.**

9.4 HORIZONTAL ACCURACY RESULTS

Geokno obtained Horizontal Accuracy of 8.2 cm against the project specification of 10 cm. The Horizontal Accuracy results are shown in the annexure.

9.5 VERTICAL ACCURACY TEST PROCEDURES

The accuracy assessment has been carried out as per ASPRS Standards. Fundamental Vertical Accuracy (FVA) is determined by comparing the DGPS points collected at project site. Such **116 numbers of DGPS points** are located at an interval of 5 Kms in the project area. For each DGPS Point Easting, Northing and Height from local MSL datum are determined. This is realized by DGPS survey of these points.

9.6 VERTICAL ACCURACY TESTING STEPS

The ellipsoidal height measured by DGPS of these points is first converted to the Orthometric height using EGM 2008 and later using the local vertical datum transformation model (which is developed separately) these Orthometric heights are converted to the heights from local MSL datum. The deviation in vertical height between DGPS point and the LiDAR data is computed, tabulated and found to be within the project accuracy.

9.7 VERTICAL ACCURACY RESULTS

Geokno obtained Vertical Accuracy of 8.9 cm against the project specification of 10 cm. The Horizontal Accuracy results are shown in the annexure.

9.8 SPATIAL DISTRIBUTION VALIDATION

The Spatial Distribution validation of Aerial Data ensures the uniform density of point cloud data throughout the project area. The Project area was checked if gaps related to the flight acquisition are present in the dataset. This check was done visually on the overlap between the runs. No gaps have been found. All flown runs have overlap with neighbouring runs. Below is an image depicting the AOI with buffer thick red line on the outside and trajectory coverage represented with green colour lines. We can see clearly that the trajectories are covering the whole AOI ensuring whole area is covered. The Data coverage is also checked with the help of Flight line numbers noted in data log sheets. The check on the point density requirements was executed in the pre -processing phase. The amount of points per square meter was calculated randomly at different location throughout the Area of Interest. In these analysis, the point density at all the location is meeting or exceeding 10 points per square meter. Point density reduction could take place in the following situations, Lower reflection due to high absorbing material and terrain circumstances, like water bodies or steep terrain.

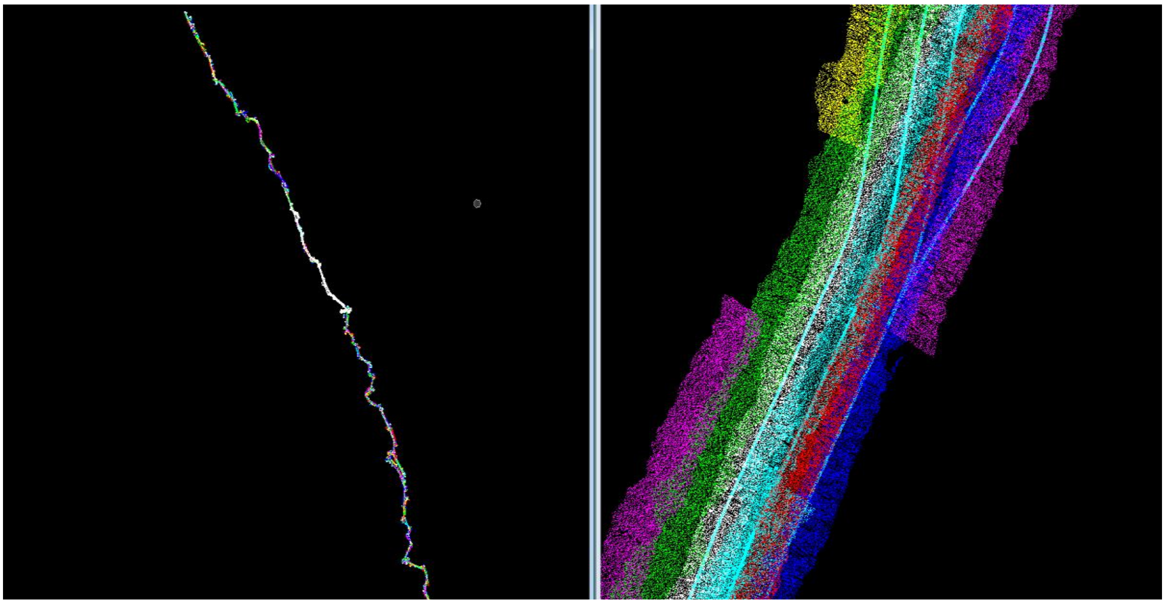


Figure 57: Aerial Point Cloud Coverage of project area

10 QUALITY ASSURANCE & QUALITY CONTROL

Geokno follows a detailed Standard Operating Procedures which is being adhered by all the project staff. This guide provides detailed instructions on the production and QA/QC (Quality Assurance/Quality Control) processes and details the in-house acceptance criteria that the deliverable must pass before proceeding to the next in-line production stage or delivery stage. This guide also specifies the data formatting and Meta-data generation requirements for deliverables.

QA processes is based on our decade old proven knowledge in building of quality processes and checks along with execution into the production cycle. Multiple steps are required to create LiDAR and classified product files. We built self-checking quality control procedures into the production process to prevent possible inconsistencies or failure. The reliability of each process step was confirmed before the next step in production can begin. Additional tools for quality assurance include process control, statistical measurements, automated checking routines, visual inspection, and operator accountability.

The QA was performed on the final deliverables like DEM, DSM, Ortho, contours and Topographical Map generated. The QA process ensured that any produced data that did not met the desired QA specifications was tagged and assessed by the staff responsible for QC for reporting and correction. Apart from the normal QC checks, the final versions of the files underwent Quality Assurance (QA) process approval.

This was primarily a Random Sampling that passes the clearance criteria. For Example, a sample of 10% data from each batch was chosen for QA. If the error percentage was more than the allowable limit, the batch was rejected and again sent back to production team for correction/ rework. We have in-built self-checking quality control procedures governing the production process to prevent possible inconsistencies or failure.

10.1 POINT CLOUD (UNCLASSIFIED AND CLASSIFIED POINT CLOUD)

Micro Station software along with Terrascan Utility were used to classify the point cloud into different classes like low points, ground points and non-ground points as per ASPRS standards. For unclassified and once, the point cloud data are classified, the following checklists were used.

S.NO	LIST OF PARTICULARS	REMARKS	
		YES	NO
1.	Checked for the data completeness of the source LiDAR and the relevant inputs	✓	
2.	Checked point cloud coverage in every individual tile index for gaps/ missing areas	✓	
3.	Checked for shaved bunds, levees, and other good ground points that are not restored to the ground class	✓	
4.	Checked low and high noise points are properly classified and removed	✓	
5.	Checked Bridge and flyover are classified	✓	
6.	Checked waterbodies classification	✓	
7.	Tiling scheme coordinate reference system is the same as the point cloud data	✓	

Table 33: Checklist for Point Cloud

10.2 IMAGERY (ORTHO PHOTOGRAPHS & INTENSITY IMAGERY)

Aerial Images, TerraPhoto triangulation results (adjusted EO) along with the final LiDAR DEM were used for the Ortho photo generation. The projection parameters and Ortho resolution of 10 cm was specified. The LiDAR DEM data was used as input with the original digital image, ground control, and orientation parameters to produce the Ortho photographs in the Ortho rectification process. Seamlines editing and mosaicking were carried out to produce the seamless final Ortho mosaic.

The following checklists was used to the QA/QC of the Ortho photographs.

S. NO	LIST OF PARTICULARS	REMARKS	
		YES	NO
1.	Checked the GSD of Ortho photo and format Geotiff	✓	
2.	Sharpe edges and Borders test had been done	✓	
3.	Pictorial defects have been removed	✓	
4.	Checked for proper color balancing and Edge matching	✓	
5.	Image defects had been removed	✓	
6.	Checked Ortho for correct projection system of UTM, WGS84	✓	

Table 34: Checklist for Imagery

10.3 DRAWINGS (CONTOUR)

Contours were derived from DTM surface prepared from Classified LiDAR Ground Points. The generated contours were smoothed using standard tools and techniques. Once contours were prepared, the following checks were used:

S. NO	LIST OF PARTICULARS	REMARKS	
		YES	NO
1	All the contour lines are having the same interval of 50cm.	✓	
2	Is there any contour level lines cross other level lines unexpectedly	✓	
3	Is there any contour line have branch or splits without any positive reason	✓	
4	Is there any contour lines terminated unexpectedly	✓	

5	All the contour lines are smooth and continuous lines	✓	
6	River, Slope, Valley, Hill, Ridge, Depression, saddle lines had been checked properly	✓	

Table 35: Checklist for Drawings

10.4 ELEVATION MODELS (DEM, DSM & DTM)

LiDAR point cloud data was filtered into Ground and Non-ground features as per project requirements. Break lines were captured for all hydro features such as Rivers, streams, ponds, lakes. These break lines outlining the waterbody were used to classify points inside into water class. streams and rivers were captured as double line polygons and stagnated waterbodies such as ponds and lakes were captured as polygon features. Hydro flattening was carried out as per USGS LiDAR Base specification guidelines by using the break lines captured above. The hydro-flattening is the process of creating a LiDAR derived DEMs in which water surface will appear/ behave as they would be in traditional photogrammetric methods produced DEM. Digital Surface Model (DSM) was prepared from Last Return Data.

Roadways crossing drainages/ passing through culverts remain in the Digital Elevation Model (DEM) because they are part of the original/ landscape depicting the real ground surface, whereas bridges and all other manmade features above the landscape/ground were removed. Geokno digitized hydrological features and edge of waterlines using 3D LiDAR point cloud using Ortho photographs as a reference. Each tile's hydrology feature was digitized in true horizontal position, and the Feature Type and Class were captured along with X, Y, and Z attributes. The following checklists were used to the QA/QC of the DEM, DSM and DTM.

S. NO	LIST OF PARTICULARS	REMARKS	
		YES	NO
1.	Checked whether the given study area was covered with DEM, DTM & DSM	✓	
2.	DEM & DSM Resolution is 1m. Statistical testing had been done	✓	
3.	Visual testing had been done	✓	
4.	DEM (max & min elevation) had been compared with contour (max & min elevation)	✓	

5.	Slope testing had been done	✓	
6.	Edge matching had been done	✓	
7.	Classification error testing had been done	✓	
8.	Checked for Ground Spikes	✓	
9.	Hydro-flattening had been done as per RFP Specifications	✓	

Table 36: Checklist for Elevation Models

10.5 DRAWING (3D TOPOGRAPHICAL MAP, L.S, C.S AND BREAKLINES)

3D Feature extraction was carried out from Aerial LiDAR point cloud with Ortho photographs as reference. Once, the features were extracted in the standard CAD platform, layer, Topology Building and Validation, Attribution, Layout preparation were performed to prepare the topographic map.

The following checklists was used to the QA/QC of the project deliverables.

S. NO	LIST OF PARTICULARS	REMARKS	
		YES	NO
1	Checked whether the given study area was covered completely with Topographical map	✓	
2	Checked whether any object was missed during feature extraction	✓	
3	Checked whether all the objects are extracted into their corresponding layers as mentioned in the sample	✓	
4	Checked whether the extracted objects contain any XY problems	✓	
5	Checked whether delivered parts are matched	✓	

6	Checked the overall interpretation error	✓	
7	Checked for elevation Spikes	✓	

Table 37: Checklist for Drawings

11 APPENDIX

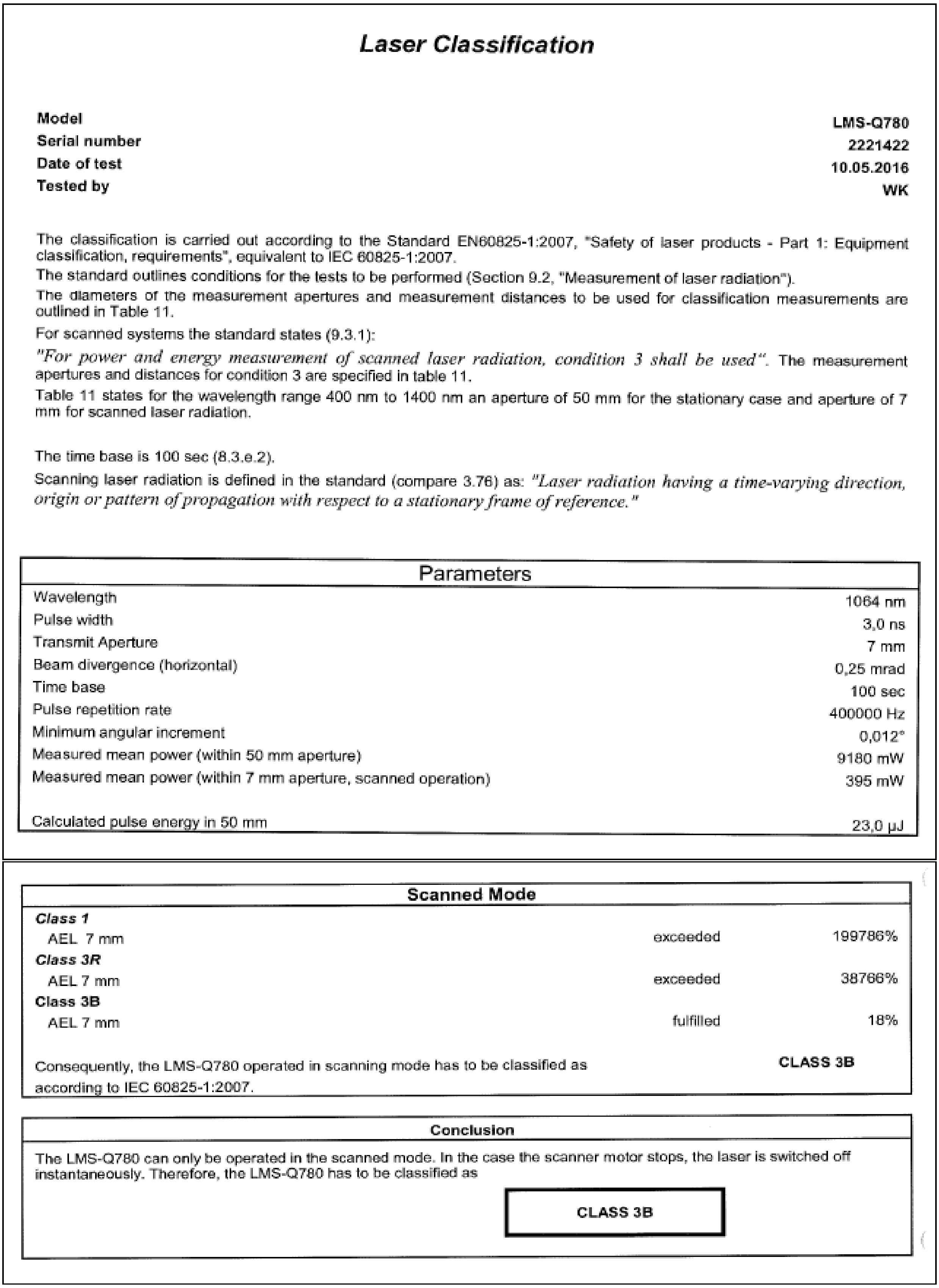
The following survey reports and details are appended to this report;

1. Calibration Certificates of Survey Components
2. Traverse Register
3. Daily Flight Log Sheets
4. Daily Data Transfer Records
5. Data Submission form
6. Spatial Accuracy Table
7. Post-Security Vetting Letter
8. Details/List of Road Crossings
9. Details/List of Power line crossing
10. Details/List of Bridges
11. DGPS Survey Report

AERIAL LIDAR SYSTEM

LMS Q780 SCANNER

CALIBRATION CERTIFICATE



Laser Classification

Model	**LMS-Q780**
Serial number	**2221422**
Date of test	**10.05.2016**
Tested by	**WK**

The classification is carried out according to the Standard EN60825-1:2007, "Safety of laser products - Part 1: Equipment classification, requirements", equivalent to IEC 60825-1:2007.

The standard outlines conditions for the tests to be performed (Section 9.2, "Measurement of laser radiation").

The diameters of the measurement apertures and measurement distances to be used for classification measurements are outlined in Table 11.

For scanned systems the standard states (9.3.1):

"For power and energy measurement of scanned laser radiation, condition 3 shall be used". The measurement apertures and distances for condition 3 are specified in table 11.

Table 11 states for the wavelength range 400 nm to 1400 nm an aperture of 50 mm for the stationary case and aperture of 7 mm for scanned laser radiation.

The time base is 100 sec (8.3.e.2).

Scanning laser radiation is defined in the standard (compare 3.76) as: *"Laser radiation having a time-varying direction, origin or pattern of propagation with respect to a stationary frame of reference."*

Parameters	
Wavelength	1064 nm
Pulse width	3,0 ns
Transmit Aperture	7 mm
Beam divergence (horizontal)	0,25 mrad
Time base	100 sec
Pulse repetition rate	400000 Hz
Minimum angular increment	0,012°
Measured mean power (within 50 mm aperture)	9180 mW
Measured mean power (within 7 mm aperture, scanned operation)	395 mW
Calculated pulse energy in 50 mm	23,0 µJ

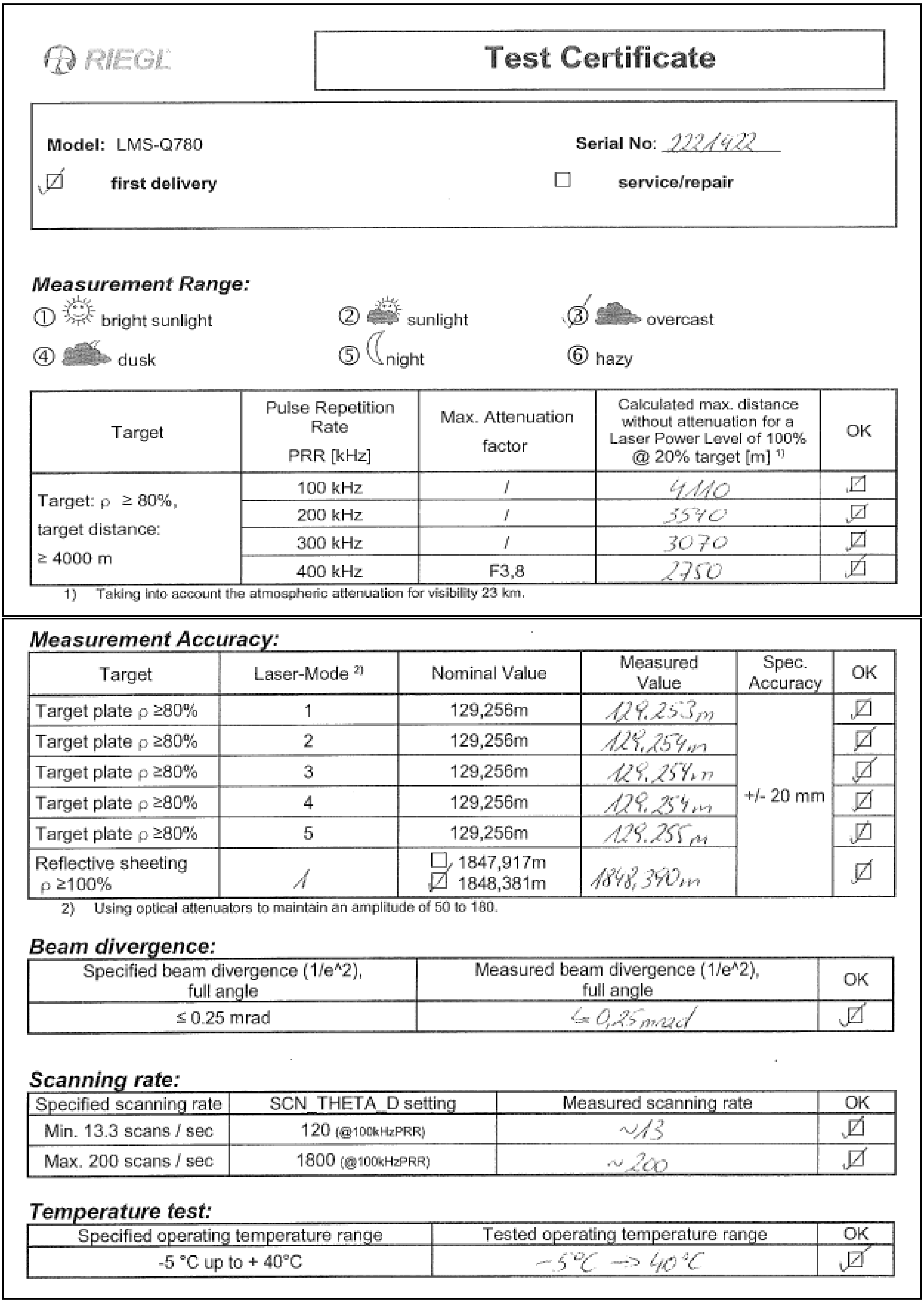
Scanned Mode		
Class 1		
AEL 7 mm	exceeded	199786%
Class 3R		
AEL 7 mm	exceeded	38766%
Class 3B		
AEL 7 mm	fulfilled	18%

Consequently, the LMS-Q780 operated in scanning mode has to be classified as according to IEC 60825-1:2007. **CLASS 3B**

Conclusion

The LMS-Q780 can only be operated in the scanned mode. In the case the scanner motor stops, the laser is switched off instantaneously. Therefore, the LMS-Q780 has to be classified as

CLASS 3B



RIEGL

Test Certificate

Model: LMS-Q780

Serial No: 2221422

☑ **first delivery**

☐ **service/repair**

Measurement Range:

① bright sunlight ② sunlight [✓ ③ overcast]

④ dusk ⑤ night ⑥ hazy

Target	Pulse Repetition Rate PRR [kHz]	Max. Attenuation factor	Calculated max. distance without attenuation for a Laser Power Level of 100% @ 20% target [m] [1]	OK
Target: ρ ≥ 80%, target distance: ≥ 4000 m	100 kHz	/	4110	☑
	200 kHz	/	3570	☑
	300 kHz	/	3070	☑
	400 kHz	F3,8	2750	☑

1) Taking into account the atmospheric attenuation for visibility 23 km.

Measurement Accuracy:

Target	Laser-Mode [2]	Nominal Value	Measured Value	Spec. Accuracy	OK
Target plate ρ ≥80%	1	129,256m	129,253m	+/- 20 mm	☑
Target plate ρ ≥80%	2	129,256m	129,254m		☑
Target plate ρ ≥80%	3	129,256m	129,254m		☑
Target plate ρ ≥80%	4	129,256m	129,254m		☑
Target plate ρ ≥80%	5	129,256m	129,255m		☑
Reflective sheeting ρ ≥100%	1	☐ 1847,917m ☑ 1848,381m	1848,390m		☑

2) Using optical attenuators to maintain an amplitude of 50 to 180.

Beam divergence:

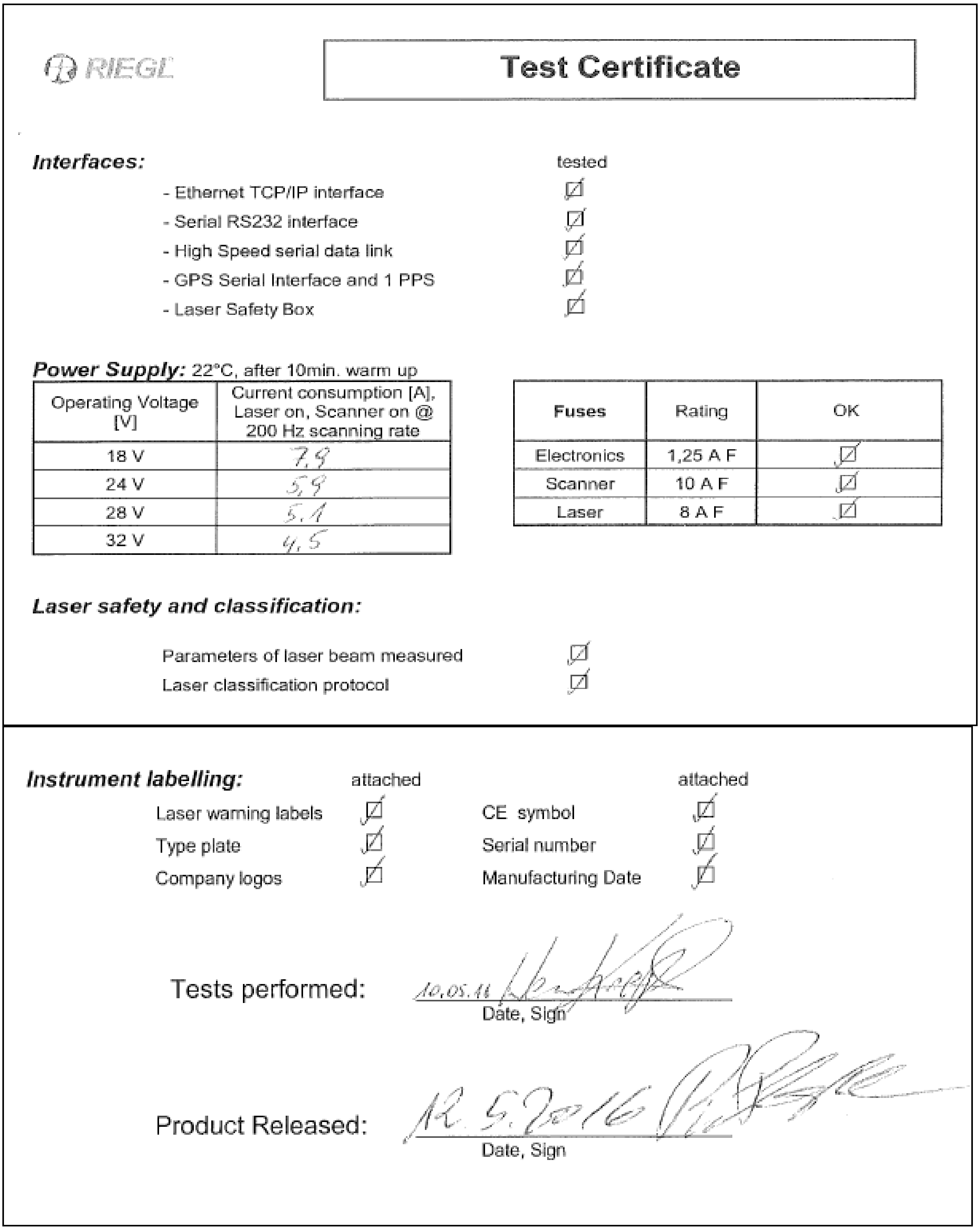
Specified beam divergence (1/e^2), full angle	Measured beam divergence (1/e^2), full angle	OK
≤ 0.25 mrad	≤ 0,25 mrad	☑

Scanning rate:

Specified scanning rate	SCN_THETA_D setting	Measured scanning rate	OK
Min. 13.3 scans / sec	120 (@100kHzPRR)	~13	☑
Max. 200 scans / sec	1800 (@100kHzPRR)	~200	☑

Temperature test:

Specified operating temperature range	Tested operating temperature range	OK
-5 °C up to + 40°C	-5°C → 40°C	☑



RIEGL

Test Certificate

Interfaces: tested

- Ethernet TCP/IP interface ☑
- Serial RS232 interface ☑
- High Speed serial data link ☑
- GPS Serial Interface and 1 PPS ☑
- Laser Safety Box ☑

Power Supply: 22°C, after 10min. warm up

Operating Voltage [V]	Current consumption [A], Laser on, Scanner on @ 200 Hz scanning rate
18 V	7,9
24 V	5,9
28 V	5,1
32 V	4,5

Fuses	Rating	OK
Electronics	1,25 A F	☑
Scanner	10 A F	☑
Laser	8 A F	☑

Laser safety and classification:

Parameters of laser beam measured ☑
Laser classification protocol ☑

Instrument labelling:

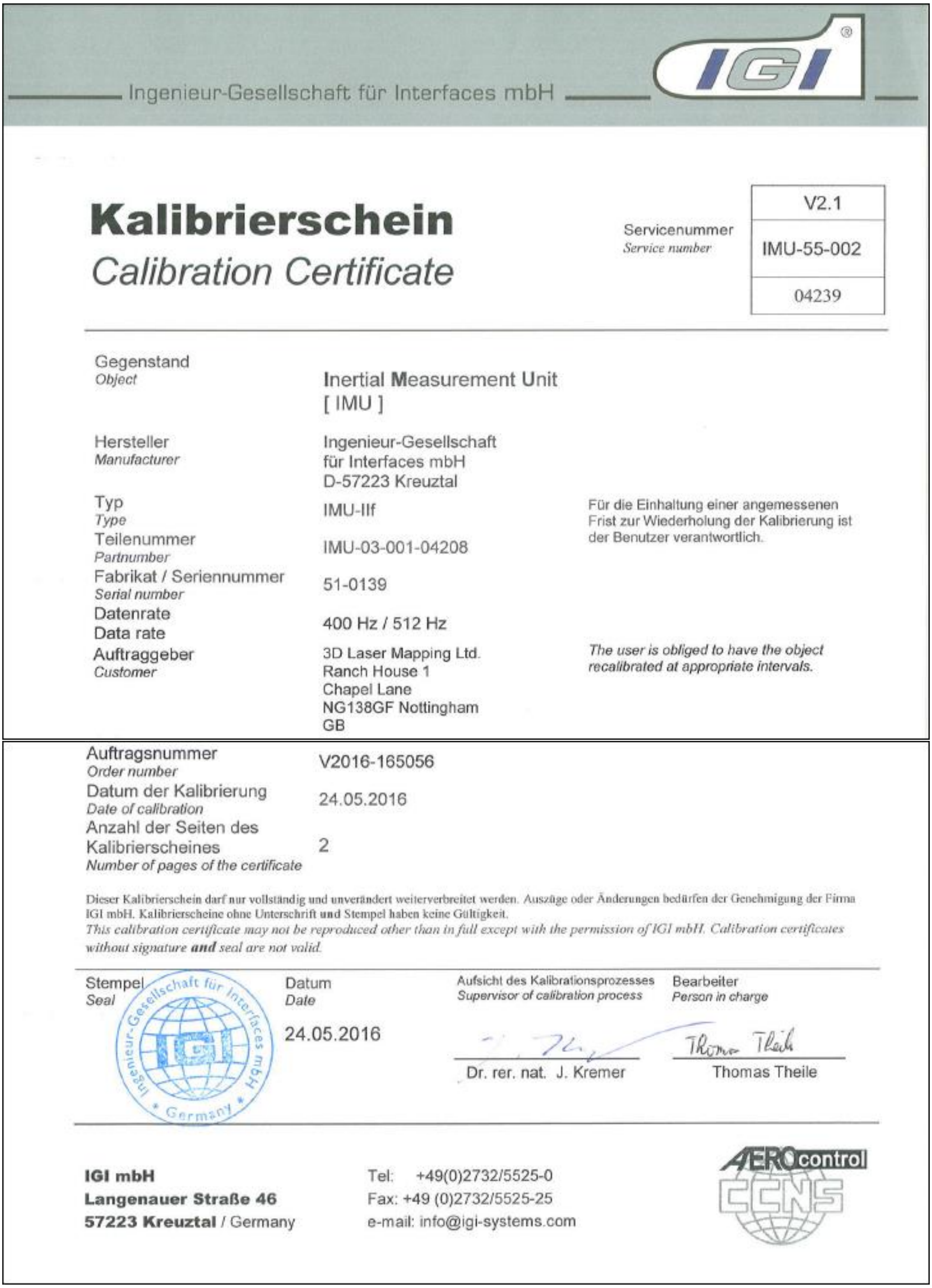
	attached		attached
Laser warning labels	☑	CE symbol	☑
Type plate	☑	Serial number	☑
Company logos	☑	Manufacturing Date	☑

Tests performed: 10.05.16
Date, Sign

Product Released: 12.5.2016
Date, Sign

AERIAL LiDAR SYSTEM

IMU CALIBRATION



Ingenieur-Gesellschaft für Interfaces mbH

Kalibrierschein
Calibration Certificate

Servicenummer *Service number*	V2.1 IMU-55-002 04239

Gegenstand *Object*	Inertial Measurement Unit [IMU]
Hersteller *Manufacturer*	Ingenieur-Gesellschaft für Interfaces mbH D-57223 Kreuztal
Typ *Type*	IMU-IIf
Teilenummer *Partnumber*	IMU-03-001-04208
Fabrikat / Seriennummer *Serial number*	51-0139
Datenrate Data rate	400 Hz / 512 Hz
Auftraggeber *Customer*	3D Laser Mapping Ltd. Ranch House 1 Chapel Lane NG138GF Nottingham GB

Für die Einhaltung einer angemessenen Frist zur Wiederholung der Kalibrierung ist der Benutzer verantwortlich.

The user is obliged to have the object recalibrated at appropriate intervals.

Auftragsnummer *Order number*	V2016-165056
Datum der Kalibrierung *Date of calibration*	24.05.2016
Anzahl der Seiten des Kalibrierscheines *Number of pages of the certificate*	2

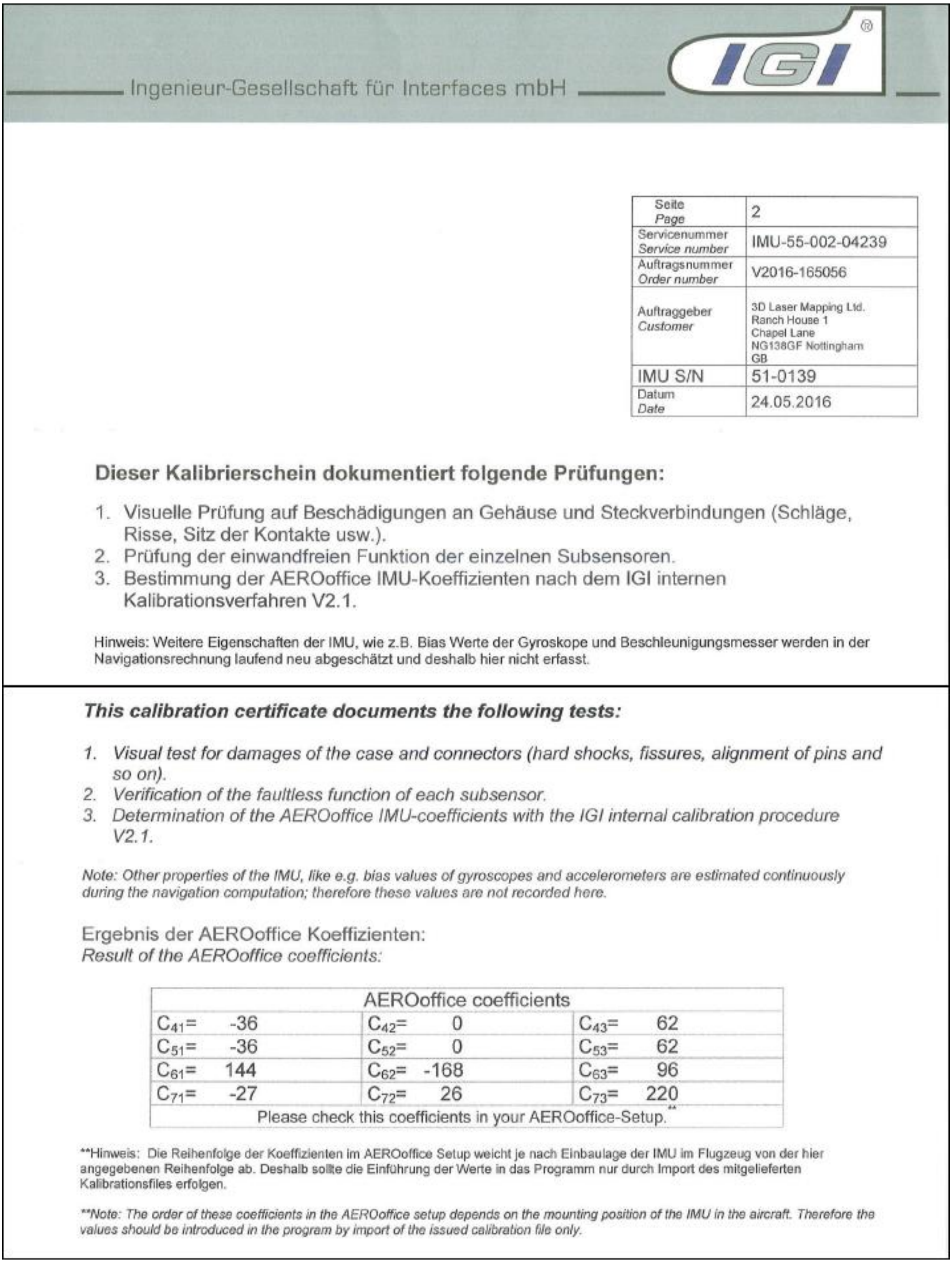
Dieser Kalibrierschein darf nur vollständig und unverändert weiterverbreitet werden. Auszüge oder Änderungen bedürfen der Genehmigung der Firma IGI mbH. Kalibrierscheine ohne Unterschrift und Stempel haben keine Gültigkeit.
This calibration certificate may not be reproduced other than in full except with the permission of IGI mbH. Calibration certificates without signature ***and*** *seal are not valid.*

Stempel *Seal*	Datum *Date*	Aufsicht des Kalibrationsprozesses *Supervisor of calibration process*	Bearbeiter *Person in charge*
	24.05.2016	Dr. rer. nat. J. Kremer	Thomas Theile

IGI mbH
Langenauer Straße 46
57223 Kreuztal / Germany

Tel: +49(0)2732/5525-0
Fax: +49 (0)2732/5525-25
e-mail: info@igi-systems.com

AEROcontrol CCNS



Ingenieur-Gesellschaft für Interfaces mbH

Seite *Page*	2
Servicenummer *Service number*	IMU-55-002-04239
Auftragsnummer *Order number*	V2016-165056
Auftraggeber *Customer*	3D Laser Mapping Ltd. Ranch House 1 Chapel Lane NG138GF Nottingham GB
IMU S/N	51-0139
Datum *Date*	24.05.2016

Dieser Kalibrierschein dokumentiert folgende Prüfungen:

1. Visuelle Prüfung auf Beschädigungen an Gehäuse und Steckverbindungen (Schläge, Risse, Sitz der Kontakte usw.).
2. Prüfung der einwandfreien Funktion der einzelnen Subsensoren.
3. Bestimmung der AEROoffice IMU-Koeffizienten nach dem IGI internen Kalibrationsverfahren V2.1.

Hinweis: Weitere Eigenschaften der IMU, wie z.B. Bias Werte der Gyroskope und Beschleunigungsmesser werden in der Navigationsrechnung laufend neu abgeschätzt und deshalb hier nicht erfasst.

This calibration certificate documents the following tests:

1. *Visual test for damages of the case and connectors (hard shocks, fissures, alignment of pins and so on).*
2. *Verification of the faultless function of each subsensor.*
3. *Determination of the AEROoffice IMU-coefficients with the IGI internal calibration procedure V2.1.*

Note: Other properties of the IMU, like e.g. bias values of gyroscopes and accelerometers are estimated continuously during the navigation computation; therefore these values are not recorded here.

Ergebnis der AEROoffice Koeffizienten:
Result of the AEROoffice coefficients:

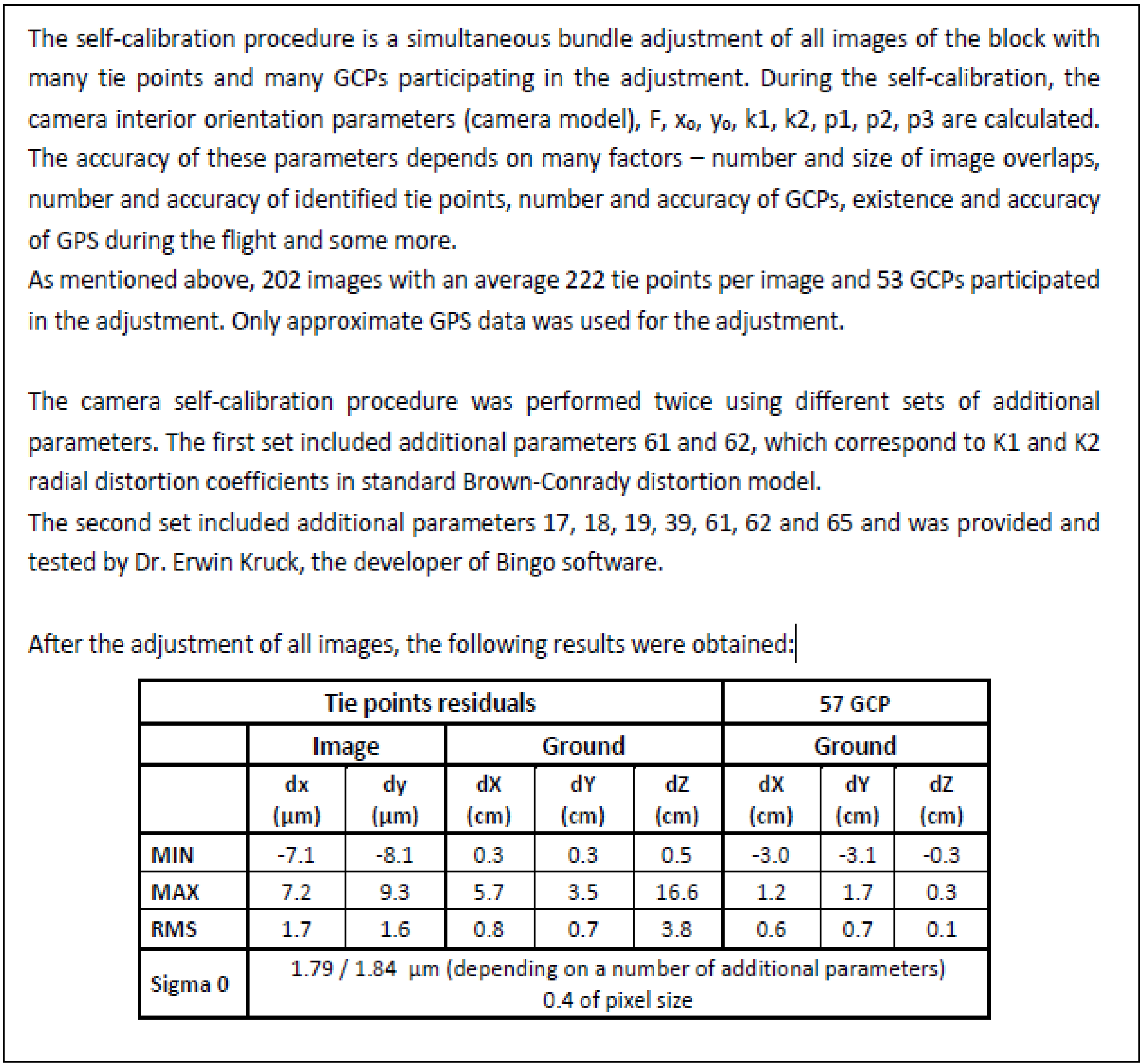
AEROoffice coefficients		
C_{41}= -36	C_{42}= 0	C_{43}= 62
C_{51}= -36	C_{52}= 0	C_{53}= 62
C_{61}= 144	C_{62}= -168	C_{63}= 96
C_{71}= -27	C_{72}= 26	C_{73}= 220
Please check this coefficients in your AEROoffice-Setup.**		

**Hinweis: Die Reihenfolge der Koeffizienten im AEROoffice Setup weicht je nach Einbaulage der IMU im Flugzeug von der hier angegebenen Reihenfolge ab. Deshalb sollte die Einführung der Werte in das Programm nur durch Import des mitgelieferten Kalibrationsfiles erfolgen.

***Note: The order of these coefficients in the AEROoffice setup depends on the mounting position of the IMU in the aircraft. Therefore the values should be introduced in the program by import of the issued calibration file only.*

AERIAL LiDAR SYSTEM

CAMERA CALIBRATION



The self-calibration procedure is a simultaneous bundle adjustment of all images of the block with many tie points and many GCPs participating in the adjustment. During the self-calibration, the camera interior orientation parameters (camera model), F, x_0, y_0, k1, k2, p1, p2, p3 are calculated. The accuracy of these parameters depends on many factors – number and size of image overlaps, number and accuracy of identified tie points, number and accuracy of GCPs, existence and accuracy of GPS during the flight and some more.

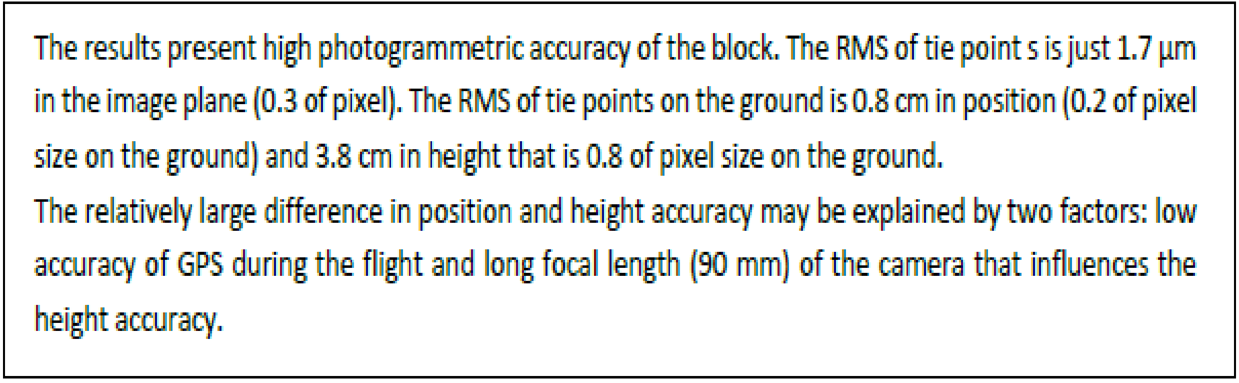
As mentioned above, 202 images with an average 222 tie points per image and 53 GCPs participated in the adjustment. Only approximate GPS data was used for the adjustment.

The camera self-calibration procedure was performed twice using different sets of additional parameters. The first set included additional parameters 61 and 62, which correspond to K1 and K2 radial distortion coefficients in standard Brown-Conrady distortion model.

The second set included additional parameters 17, 18, 19, 39, 61, 62 and 65 and was provided and tested by Dr. Erwin Kruck, the developer of Bingo software.

After the adjustment of all images, the following results were obtained:

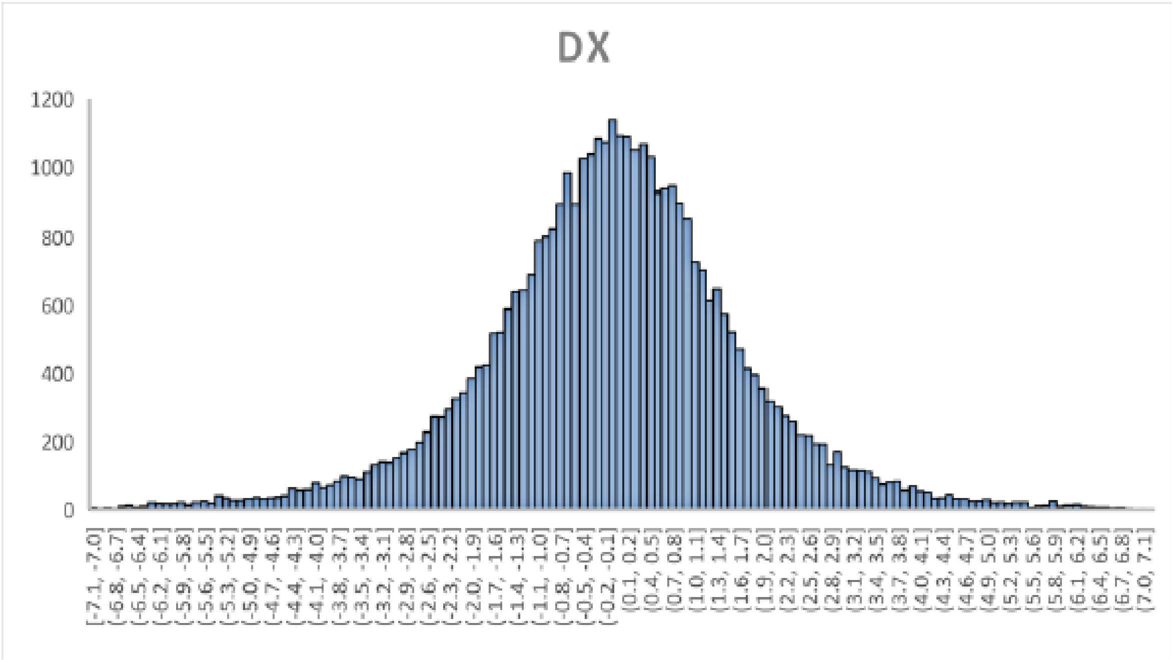
	Tie points residuals					57 GCP		
	Image		Ground			Ground		
	dx (µm)	dy (µm)	dX (cm)	dY (cm)	dZ (cm)	dX (cm)	dY (cm)	dZ (cm)
MIN	-7.1	-8.1	0.3	0.3	0.5	-3.0	-3.1	-0.3
MAX	7.2	9.3	5.7	3.5	16.6	1.2	1.7	0.3
RMS	1.7	1.6	0.8	0.7	3.8	0.6	0.7	0.1
Sigma 0	1.79 / 1.84 µm (depending on a number of additional parameters) 0.4 of pixel size							

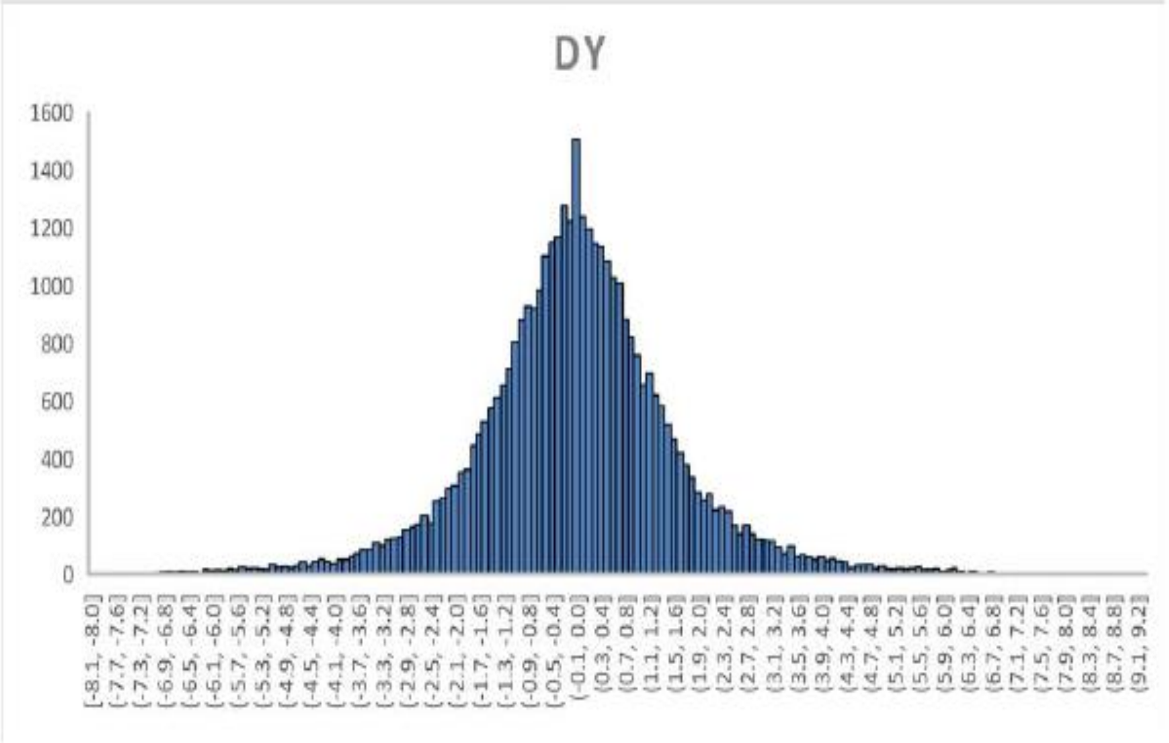


The results present high photogrammetric accuracy of the block. The RMS of tie point s is just 1.7 µm in the image plane (0.3 of pixel). The RMS of tie points on the ground is 0.8 cm in position (0.2 of pixel size on the ground) and 3.8 cm in height that is 0.8 of pixel size on the ground.

The relatively large difference in position and height accuracy may be explained by two factors: low accuracy of GPS during the flight and long focal length (90 mm) of the camera that influences the height accuracy.

Tie points image residuals distribution presented on the following charts:



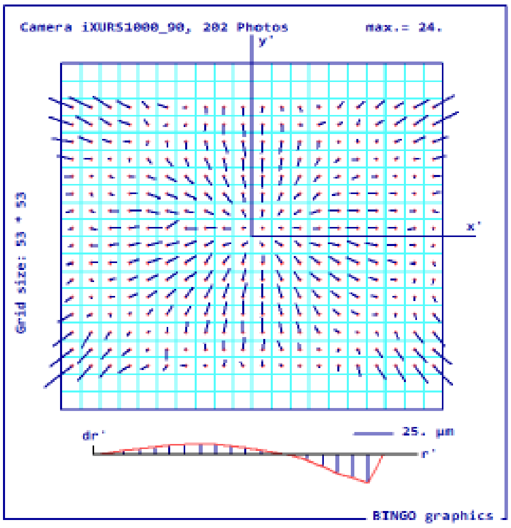


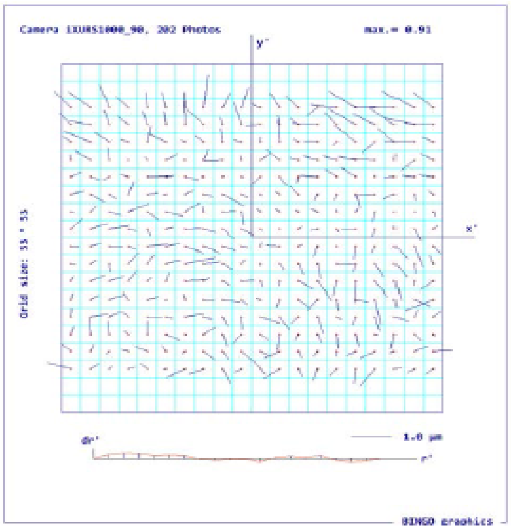
After adjustment, the following main camera parameters were calculated:

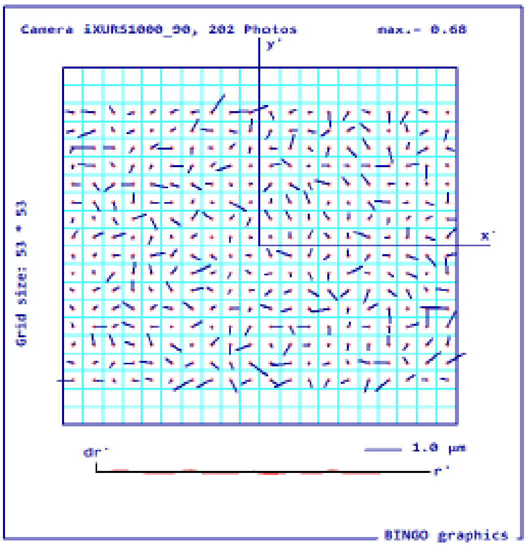
	F (mm)	Xp (mm)	Yp (mm)
	89.5447	0.0244	0.0149
RMS (µm)	10.1	1.5	1.5
RMS (pix)	2.20	0.33	0.33

The low accuracy of the focal length calculation (10.1 µm) may be explained by low accuracy of GPS data already mentioned above and by relatively flat test field area.

During the self-calibration the camera model distortion was also calculated. The left picture below presents a clearly visible symmetrical radial distortion model of the camera with a maximal distortion of 24 µm before fixing the image.







The right image presents the same image after its fixing with 61, 62 additional parameters describing a simple symmetrical radial distortion model (corresponds to K1 and K2 coefficients). Maximal residual here is 0.91 µm, which is just 0.2 of pixel (4.6 µm).

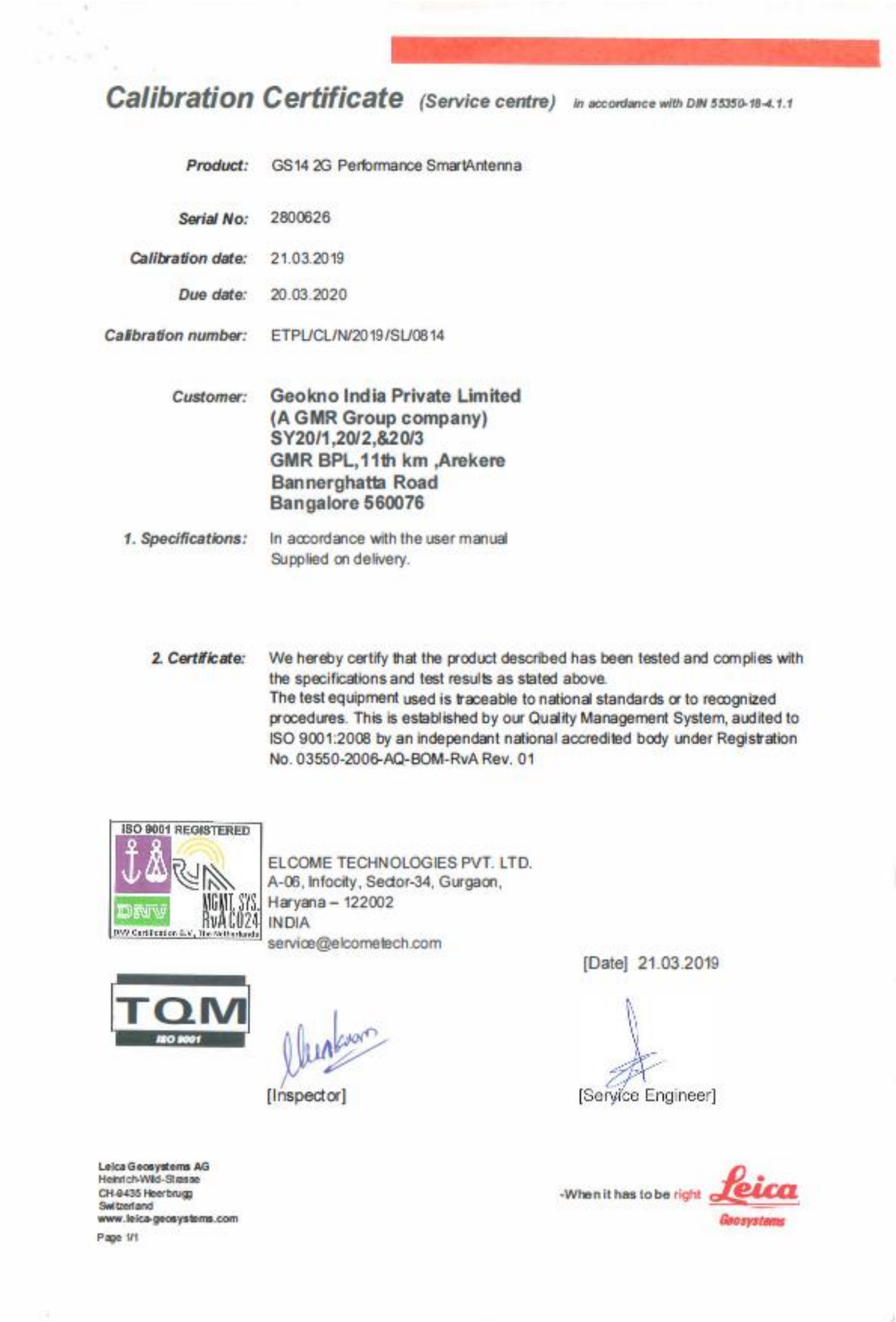
The third picture from the left presents the same camera after implementing the following additional parameters 17,18,19,39,61,62,65, describing more complicated distortion model. In this case, the maximal residual equals to 0.68 µm.

As a conclusion, it should be explicitly stated that the distortion model of the camera iXU-RS1000 with 90 mm focal length fully corresponds to a standard Brown-Conrady distortion model and images captured with the camera may be easily transformed to undistorted model with a maximal residual less than 1 µm.

QUALITY ASSURANCE

GNSS INSTRUMENTS

CALIBRATION CERTIFICATE



Calibration Certificate (Service centre) *in accordance with DIN 55350-18-4.1.1*

Product: GS14 2G Performance SmartAntenna

Serial No: 2800626

Calibration date: 21.03.2019

Due date: 20.03.2020

Calibration number: ETPL/CL/N/2019/SL/0814

Customer:
Geokno India Private Limited
(A GMR Group company)
SY20/1,20/2,&20/3
GMR BPL,11th km ,Arekere
Bannerghatta Road
Bangalore 560076

1. Specifications: In accordance with the user manual
Supplied on delivery.

2. Certificate: We hereby certify that the product described has been tested and complies with the specifications and test results as stated above.
The test equipment used is traceable to national standards or to recognized procedures. This is established by our Quality Management System, audited to ISO 9001:2008 by an independant national accredited body under Registration No. 03550-2006-AQ-BOM-RvA Rev. 01

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[Date] 21.03.2019

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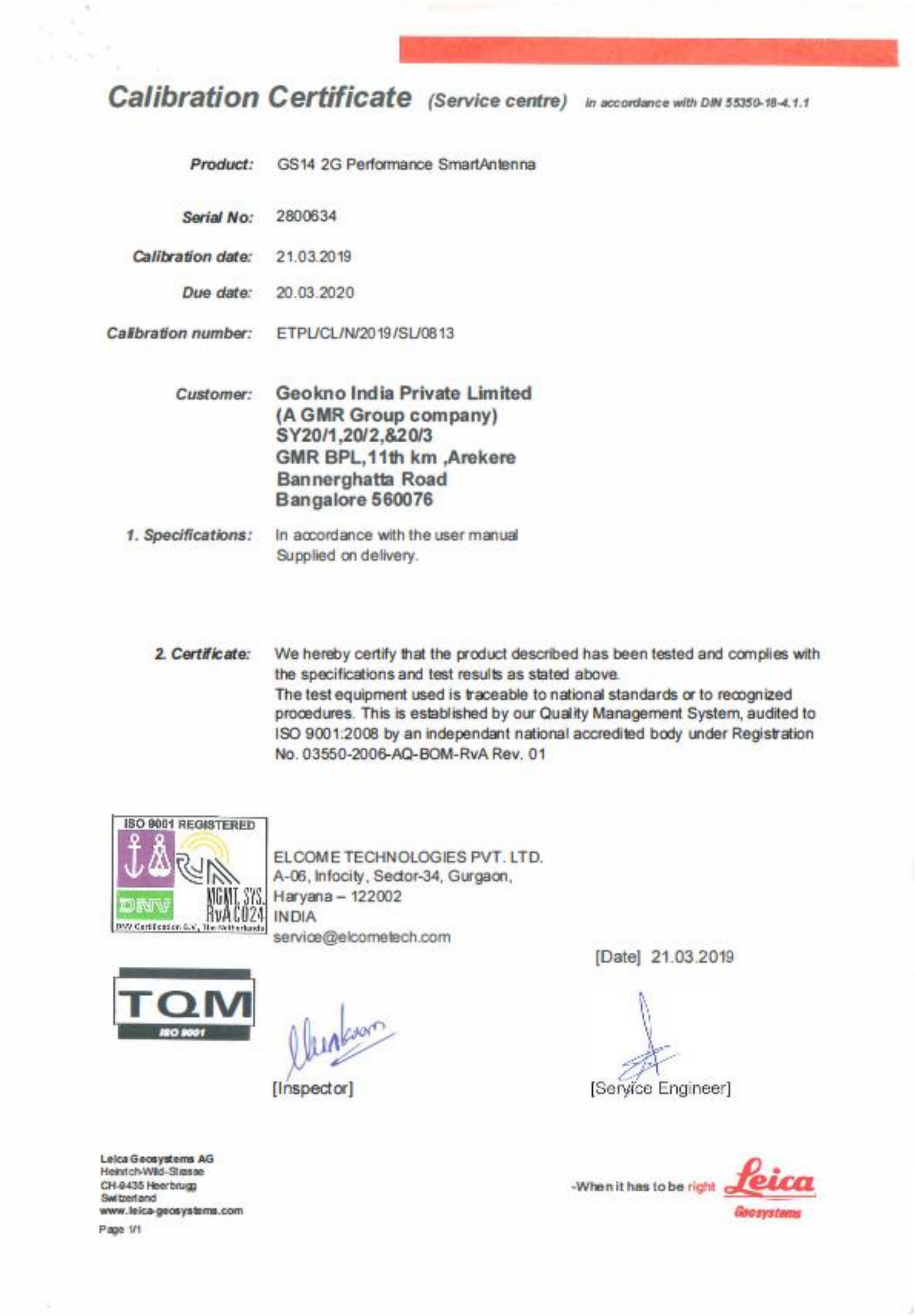

Calibration Certificate *(Service centre)* *in accordance with DIN 55350-18-4.1.1*

Product:	GS14 2G Performance SmartAntenna
Serial No:	2800634
Calibration date:	21.03.2019
Due date:	20.03.2020
Calibration number:	ETPL/CL/N/2019/SL/0813
Customer:	**Geokno India Private Limited** **(A GMR Group company)** **SY20/1,20/2,&20/3** **GMR BPL,11th km ,Arekere** **Bannerghatta Road** **Bangalore 560076**
1. Specifications:	In accordance with the user manual Supplied on delivery.
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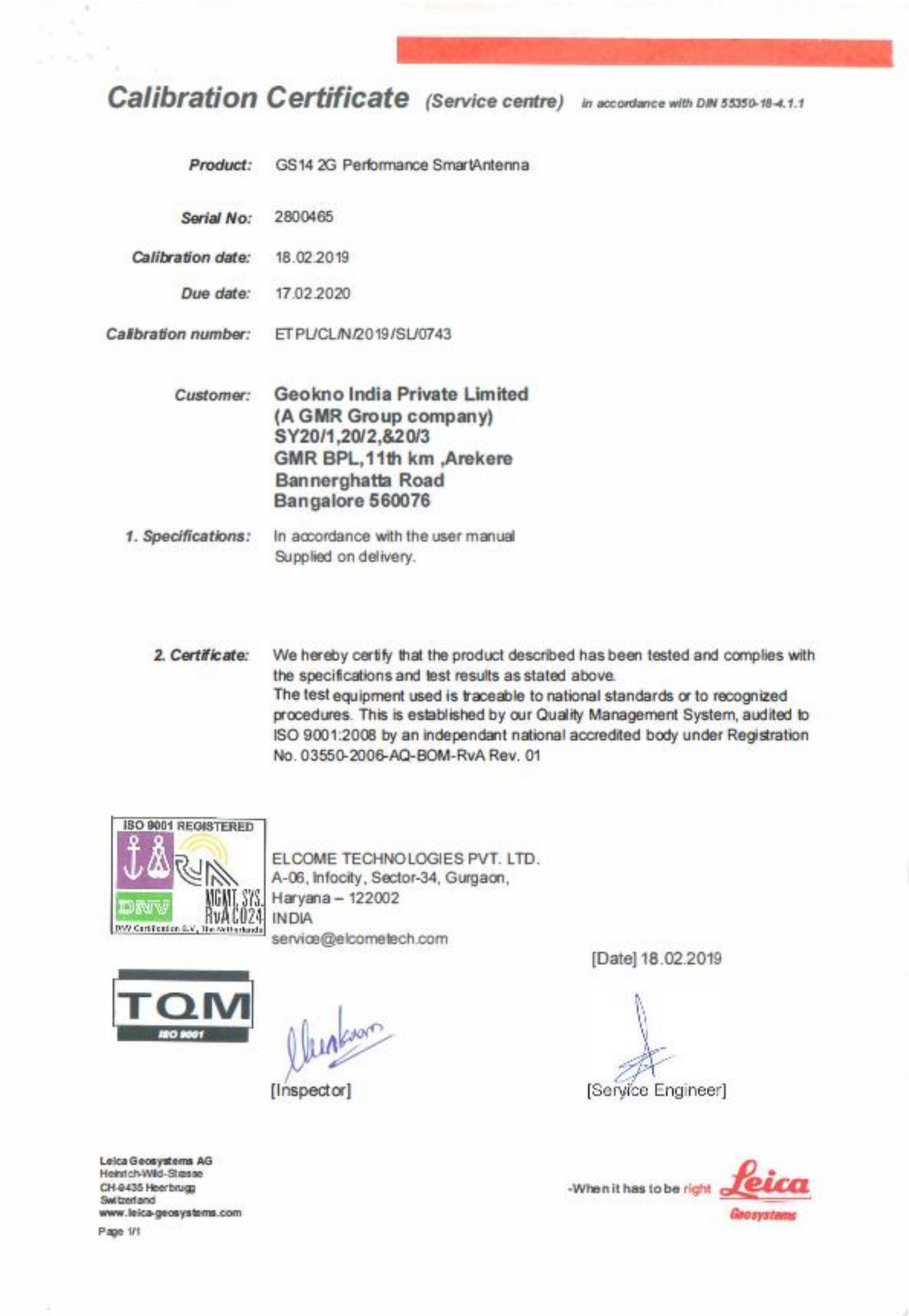

Calibration Certificate (Service centre) *in accordance with DIN 55350-18-4.1.1*

Product:	GS14 2G Performance SmartAntenna
Serial No:	2800465
Calibration date:	18.02.2019
Due date:	17.02.2020
Calibration number:	ETPL/CL/N/2019/SL/0743
Customer:	**Geokno India Private Limited** **(A GMR Group company)** **SY20/1,20/2,&20/3** **GMR BPL,11th km ,Arekere** **Bannerghatta Road** **Bangalore 560076**
1. Specifications:	In accordance with the user manual Supplied on delivery.
2. Certificate:	We hereby certify that the product described has been tested and complies with the specifications and test results as stated above. The test equipment used is traceable to national standards or to recognized procedures. This is established by our Quality Management System, audited to ISO 9001:2008 by an independant national accredited body under Registration No. 03550-2006-AQ-BOM-RvA Rev. 01

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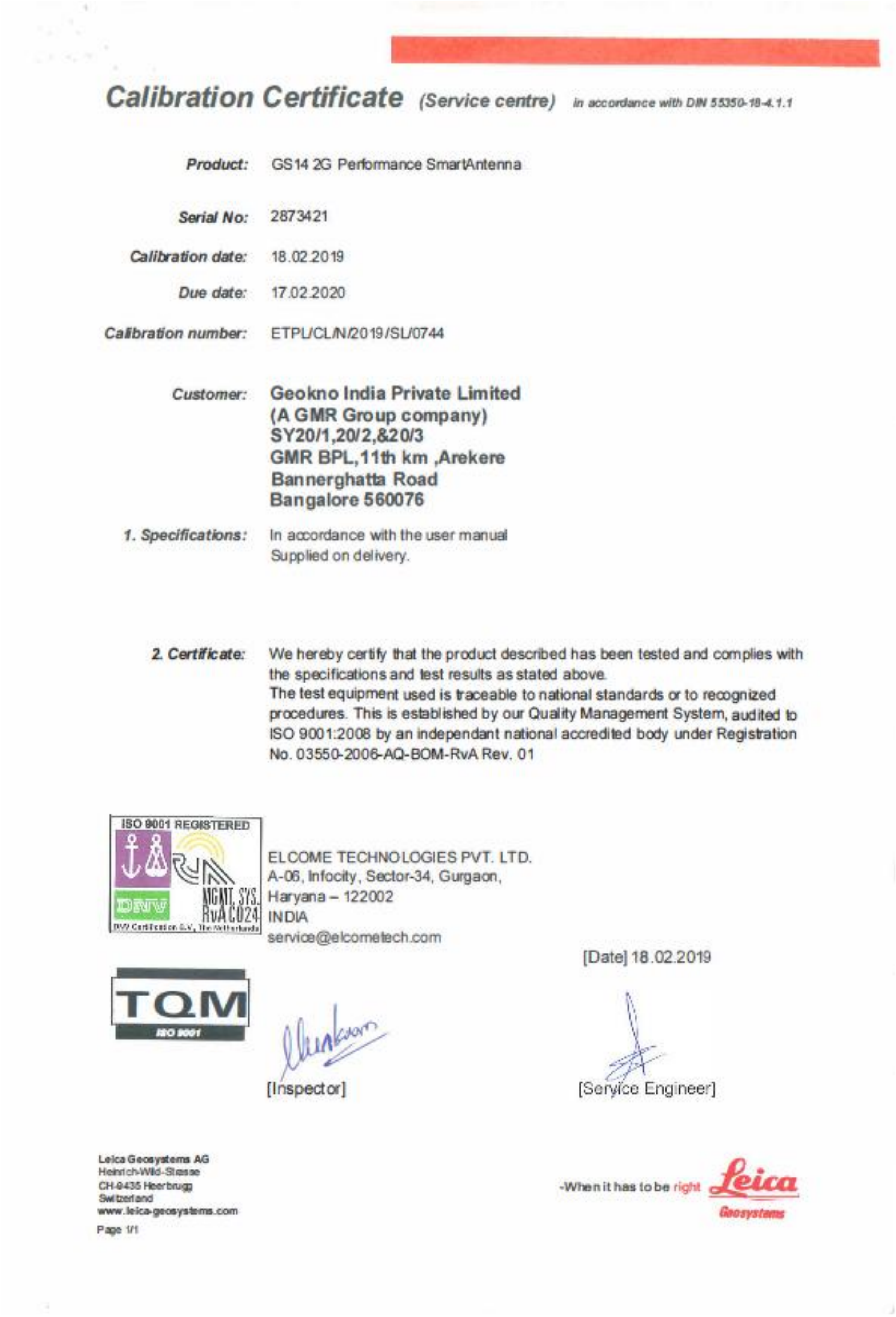

Calibration Certificate *(Service centre)* *in accordance with DIN 55350-18-4.1.1*

Product:	GS14 2G Performance SmartAntenna
Serial No:	2873421
Calibration date:	18.02.2019
Due date:	17.02.2020
Calibration number:	ETPL/CL/N/2019/SL/0744

Customer:
Geokno India Private Limited
(A GMR Group company)
SY20/1,20/2,&20/3
GMR BPL,11th km ,Arekere
Bannerghatta Road
Bangalore 560076

1. Specifications: In accordance with the user manual Supplied on delivery.

2. Certificate: We hereby certify that the product described has been tested and complies with the specifications and test results as stated above.
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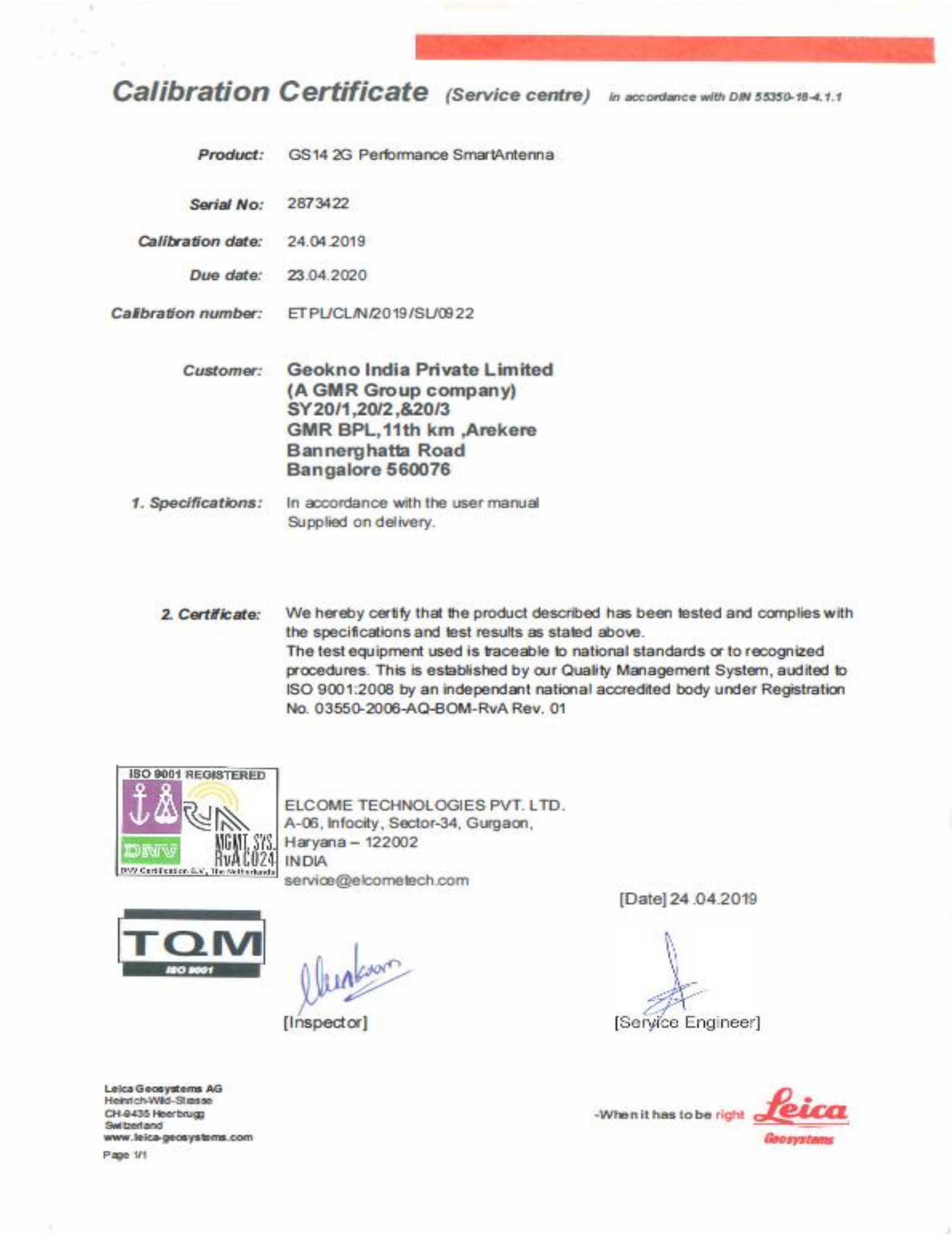

Calibration Certificate *(Service centre)* *in accordance with DIN 55350-18-4.1.1*

Product:	GS14 2G Performance SmartAntenna
Serial No:	2873422
Calibration date:	24.04.2019
Due date:	23.04.2020
Calibration number:	ETPL/CL/N/2019/SL/0922

Customer:

Geokno India Private Limited
(A GMR Group company)
SY20/1,20/2,&20/3
GMR BPL,11th km ,Arekere
Bannerghatta Road
Bangalore 560076

1. Specifications: In accordance with the user manual
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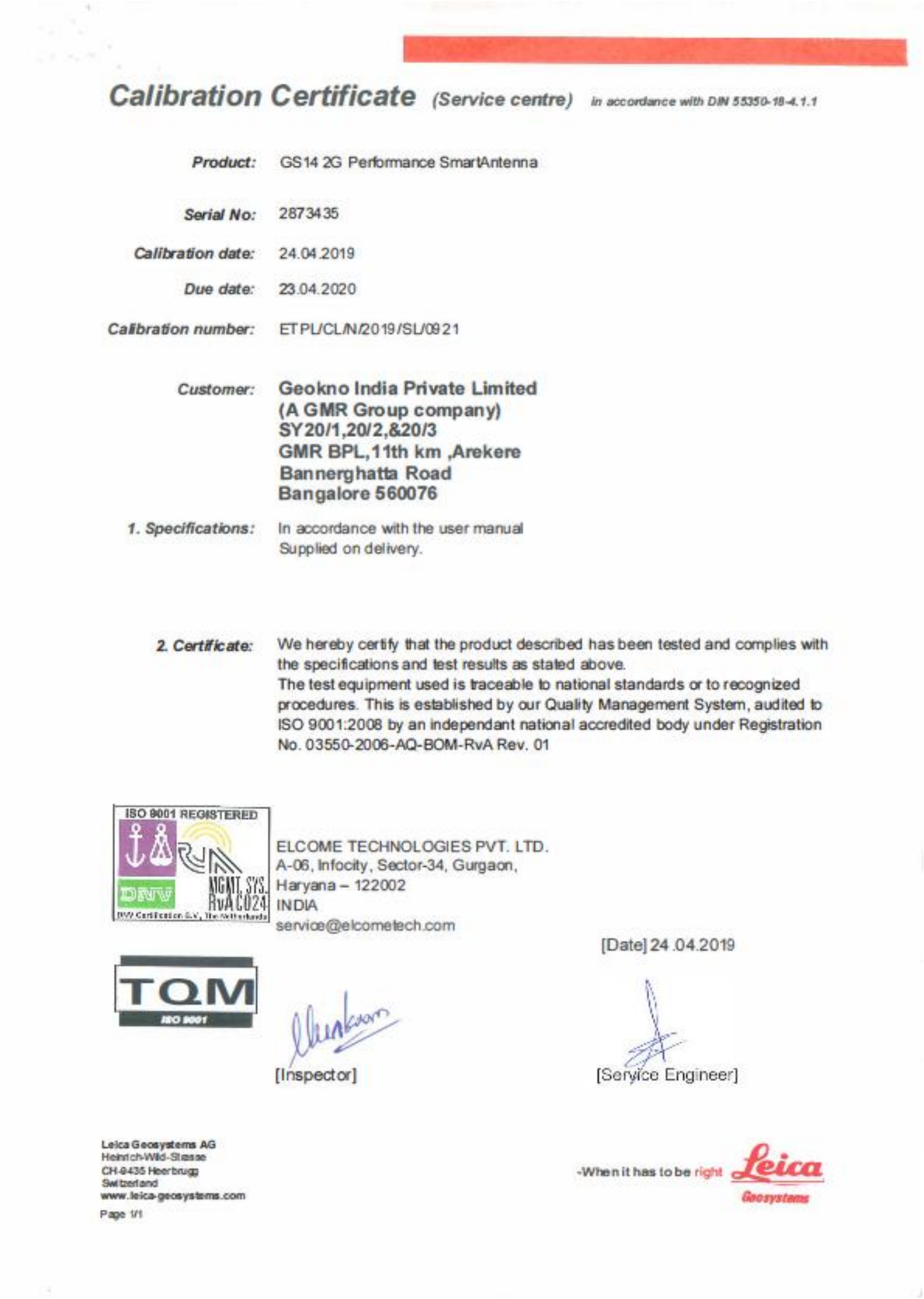

Calibration Certificate *(Service centre)* *in accordance with DIN 55350-18-4.1.1*

Product:	GS14 2G Performance SmartAntenna
Serial No:	2873435
Calibration date:	24.04.2019
Due date:	23.04.2020
Calibration number:	ETPL/CL/N/2019/SL/0921

Customer:

Geokno India Private Limited
(A GMR Group company)
SY20/1,20/2,&20/3
GMR BPL,11th km ,Arekere
Bannerghatta Road
Bangalore 560076

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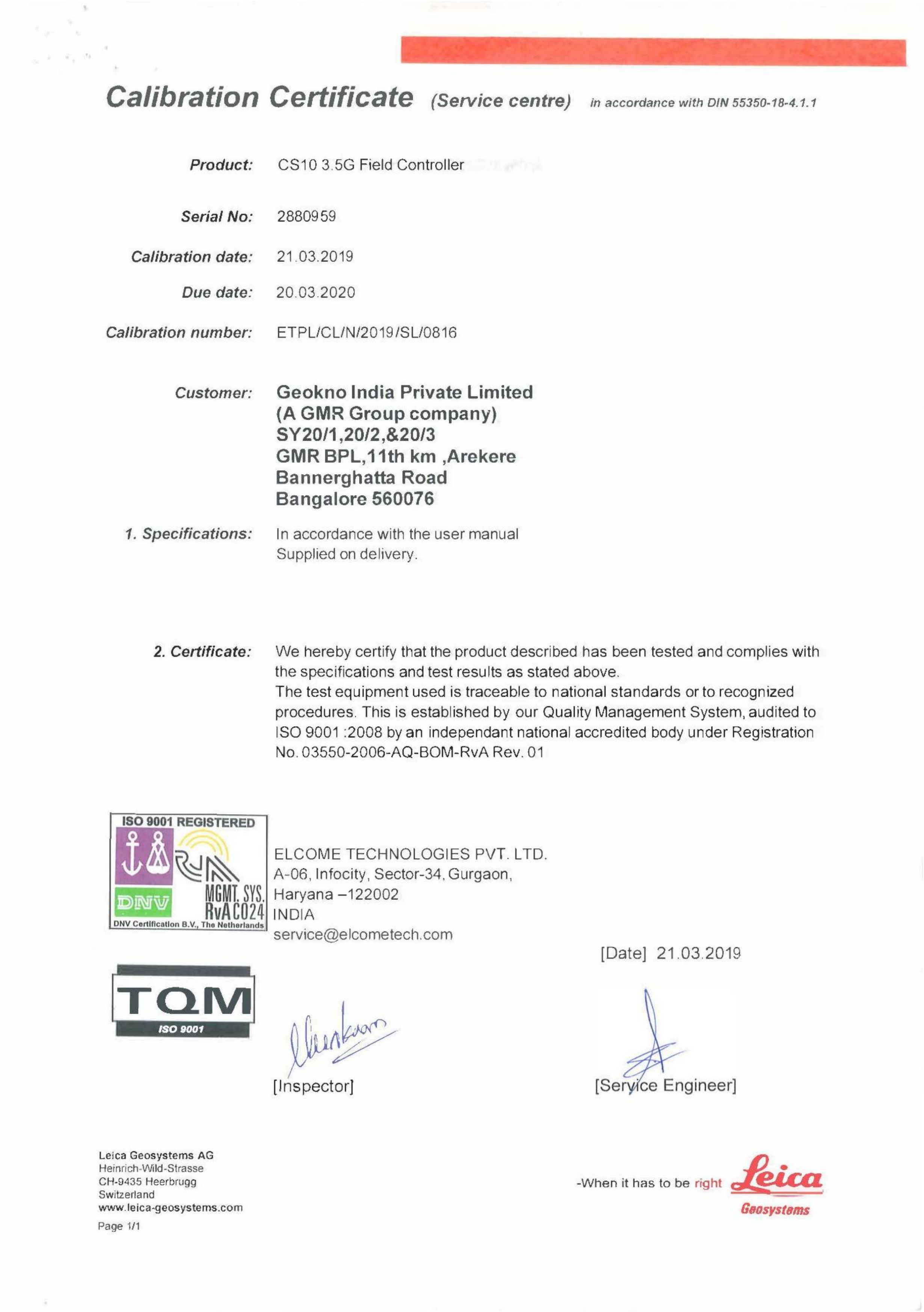

Calibration Certificate *(Service centre)* *in accordance with DIN 55350-18-4.1.1*

Product:	CS10 3.5G Field Controller
Serial No:	2880959
Calibration date:	21.03.2019
Due date:	20.03.2020
Calibration number:	ETPL/CL/N/2019/SL/0816
Customer:	**Geokno India Private Limited (A GMR Group company) SY20/1,20/2,&20/3 GMR BPL,11th km ,Arekere Bannerghatta Road Bangalore 560076**
1. Specifications:	In accordance with the user manual Supplied on delivery.
2. Certificate:	We hereby certify that the product described has been tested and complies with the specifications and test results as stated above. The test equipment used is traceable to national standards or to recognized procedures. This is established by our Quality Management System, audited to ISO 9001 :2008 by an independant national accredited body under Registration No. 03550-2006-AQ-BOM-RvA Rev. 01

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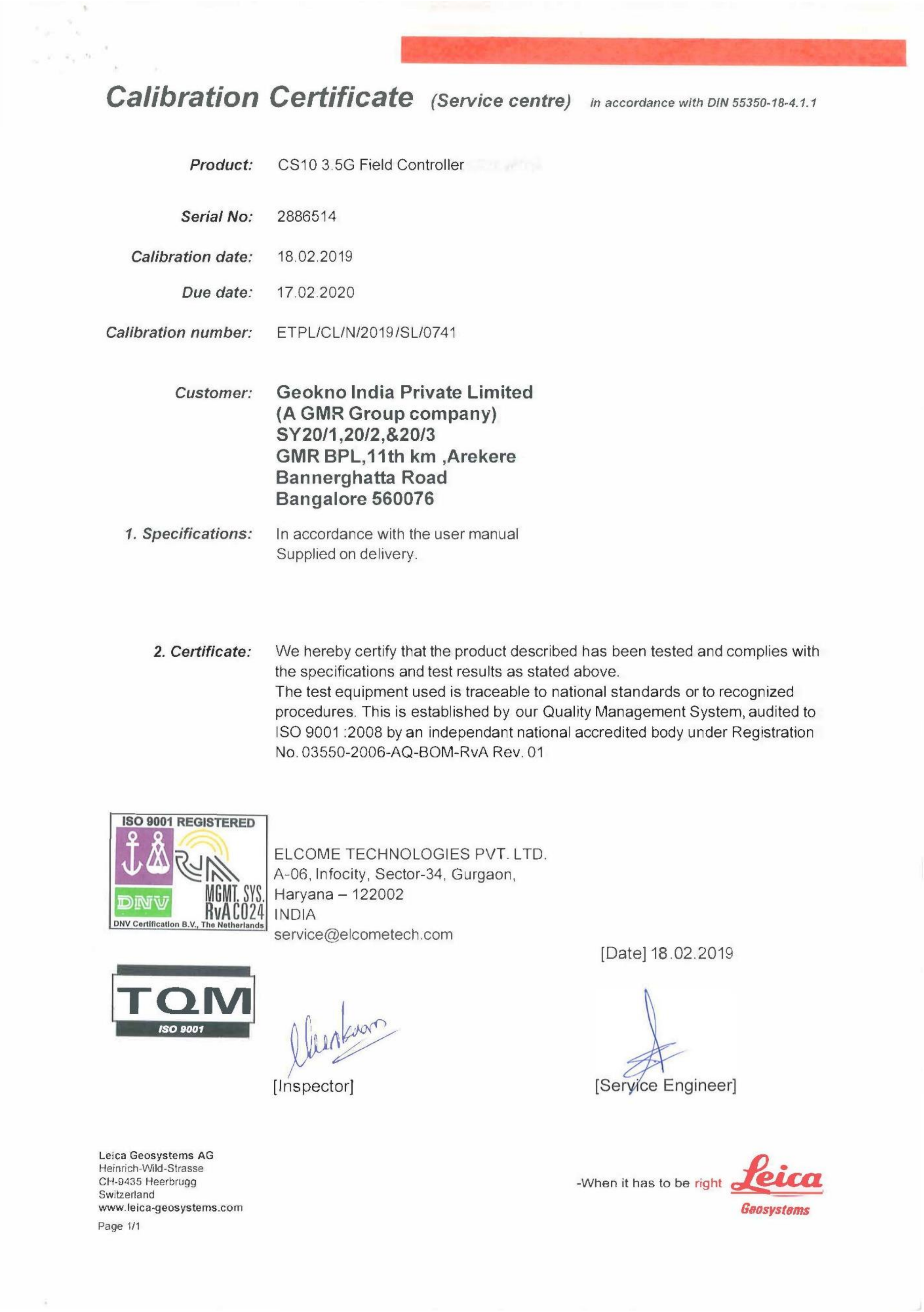

Calibration Certificate *(Service centre)* *in accordance with DIN 55350-18-4.1.1*

Product:	CS10 3.5G Field Controller
Serial No:	2886514
Calibration date:	18.02.2019
Due date:	17.02.2020
Calibration number:	ETPL/CL/N/2019/SL/0741
Customer:	**Geokno India Private Limited** **(A GMR Group company)** **SY20/1,20/2,&20/3** **GMR BPL,11th km ,Arekere** **Bannerghatta Road** **Bangalore 560076**
1. Specifications:	In accordance with the user manual Supplied on delivery.
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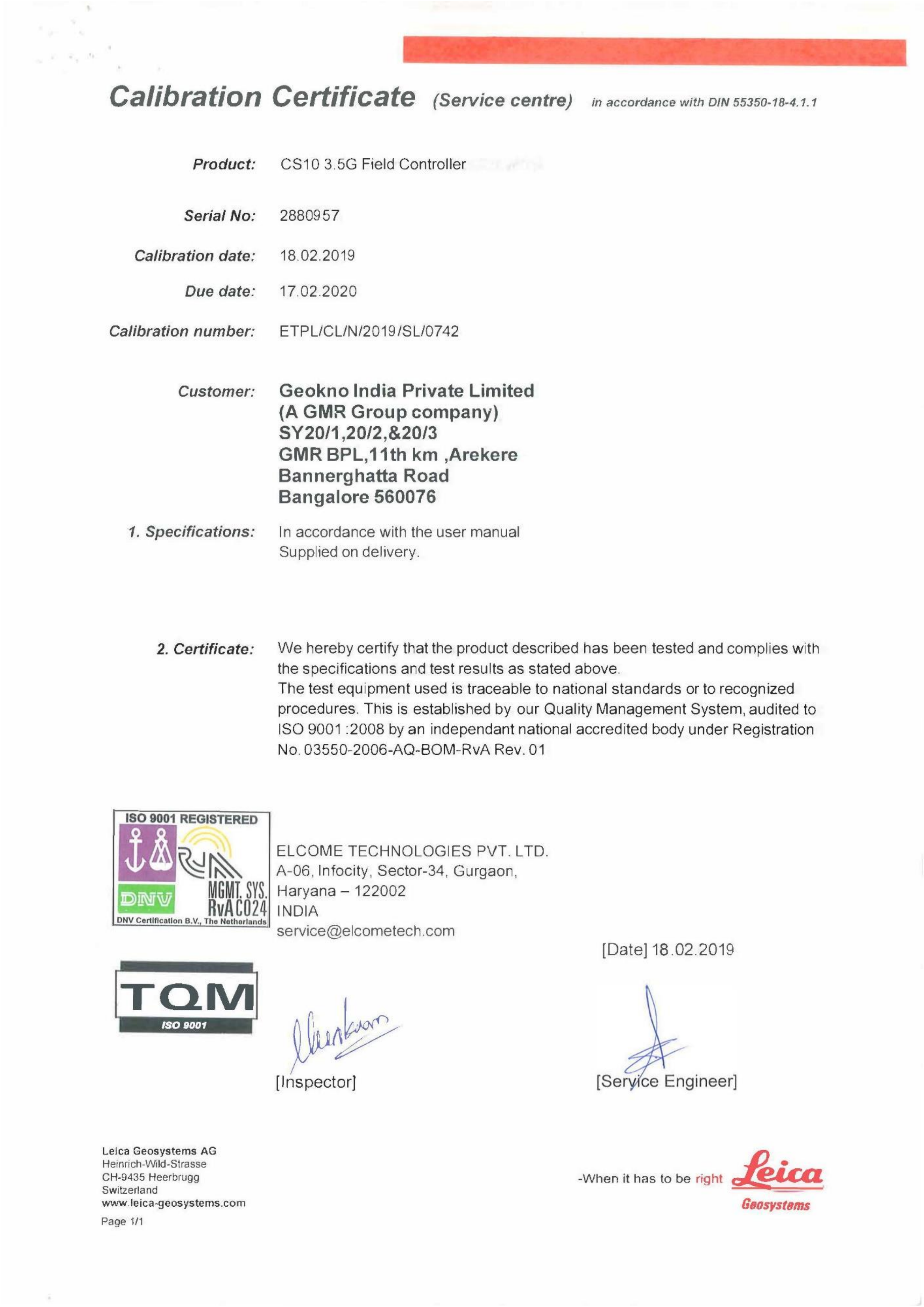

Calibration Certificate *(Service centre)* *in accordance with DIN 55350-18-4.1.1*

Product:	CS10 3.5G Field Controller
Serial No:	2880957
Calibration date:	18.02.2019
Due date:	17.02.2020
Calibration number:	ETPL/CL/N/2019/SL/0742

Customer:

Geokno India Private Limited
(A GMR Group company)
SY20/1,20/2,&20/3
GMR BPL,11th km ,Arekere
Bannerghatta Road
Bangalore 560076

1. Specifications: In accordance with the user manual Supplied on delivery.

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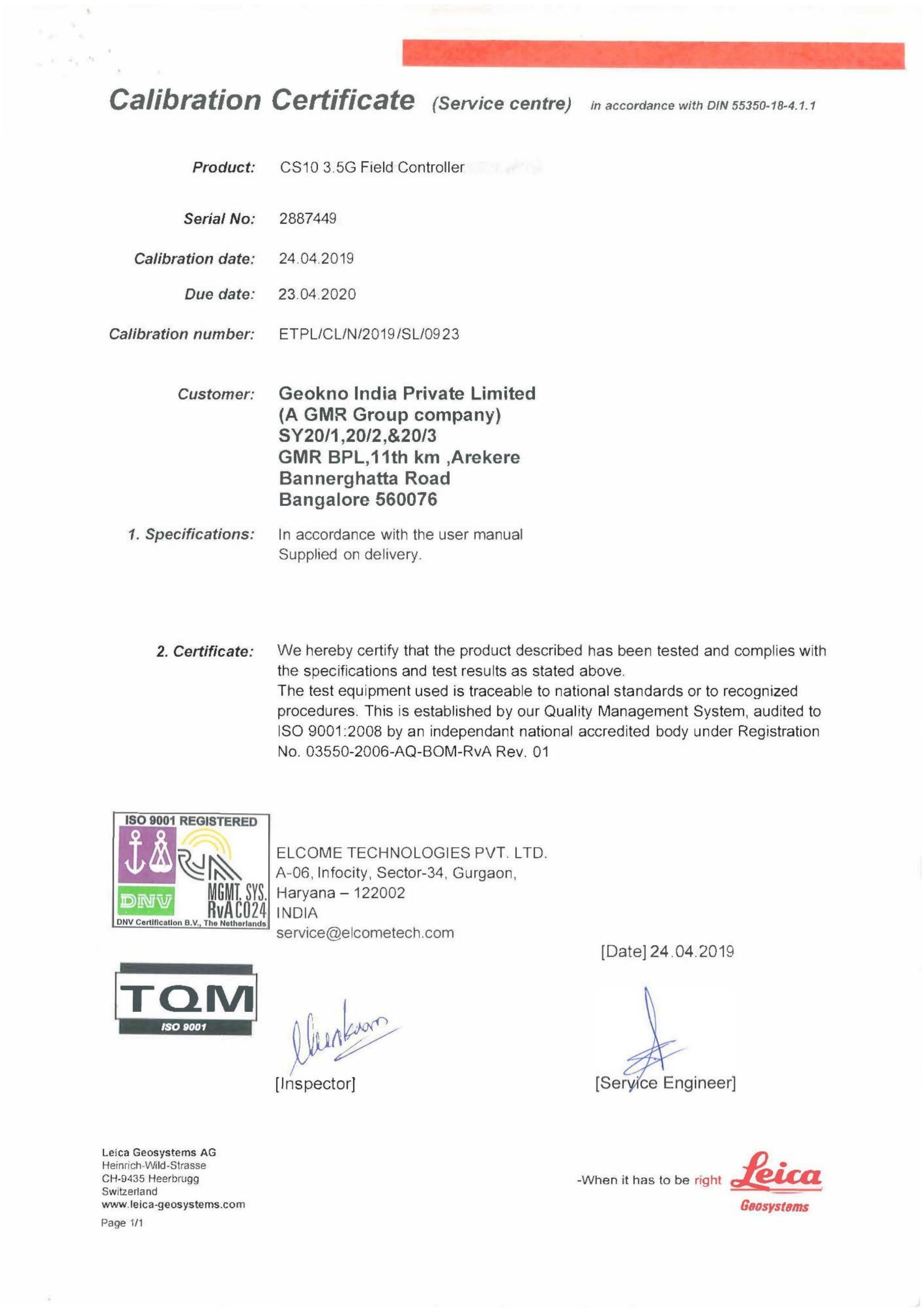

Calibration Certificate *(Service centre)* *in accordance with DIN 55350-18-4.1.1*

Product:	CS10 3.5G Field Controller
Serial No:	2887449
Calibration date:	24.04.2019
Due date:	23.04.2020
Calibration number:	ETPL/CL/N/2019/SL/0923

Customer:

Geokno India Private Limited
(A GMR Group company)
SY20/1,20/2,&20/3
GMR BPL,11th km ,Arekere
Bannerghatta Road
Bangalore 560076

1. Specifications: In accordance with the user manual Supplied on delivery.

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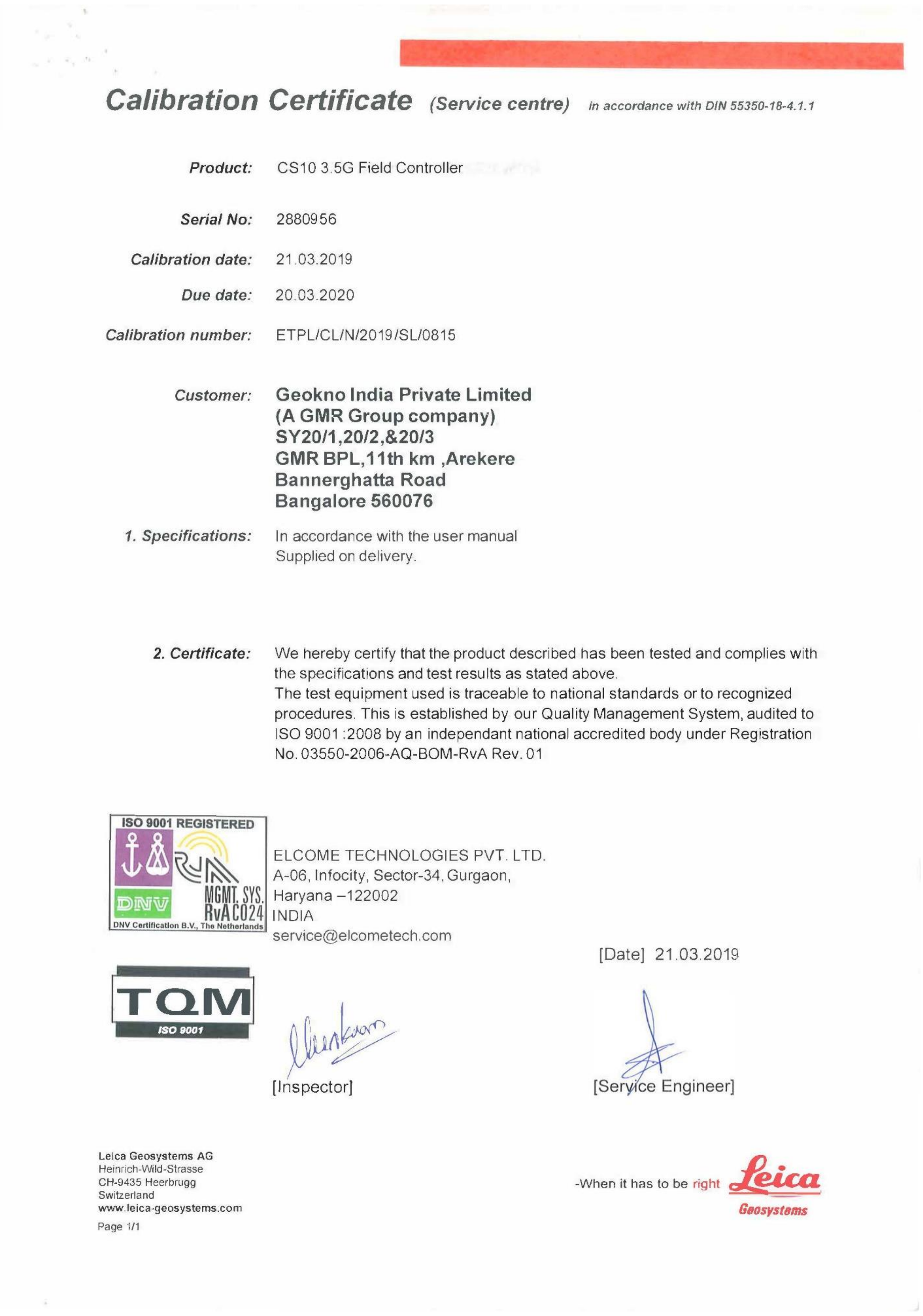

Calibration Certificate *(Service centre)* *in accordance with DIN 55350-18-4.1.1*

Product: CS10 3.5G Field Controller

Serial No: 2880956

Calibration date: 21.03.2019

Due date: 20.03.2020

Calibration number: ETPL/CL/N/2019/SL/0815

Customer:
Geokno India Private Limited
(A GMR Group company)
SY20/1,20/2,&20/3
GMR BPL,11th km ,Arekere
Bannerghatta Road
Bangalore 560076

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[Date] 21.03.2019

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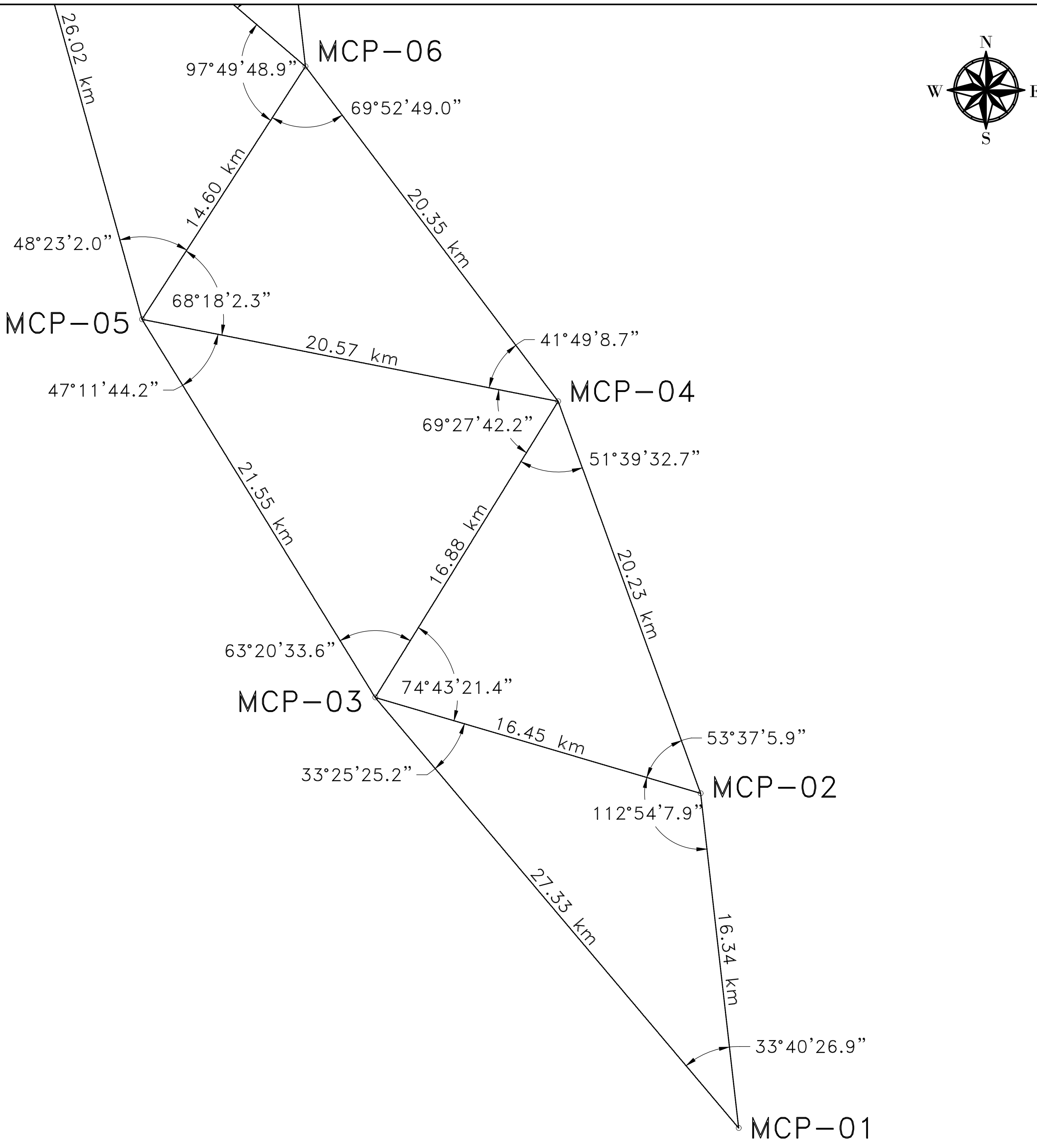
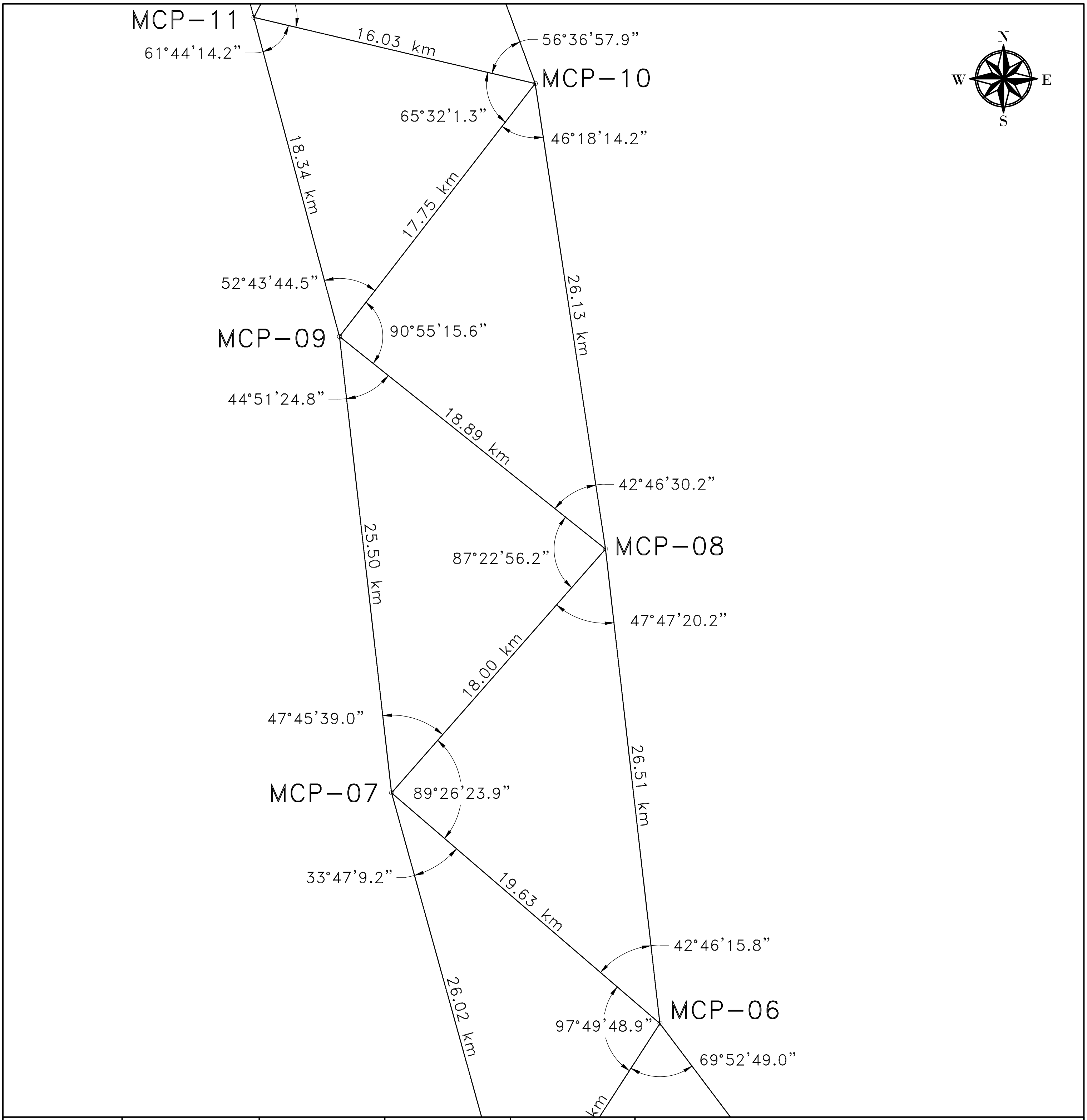
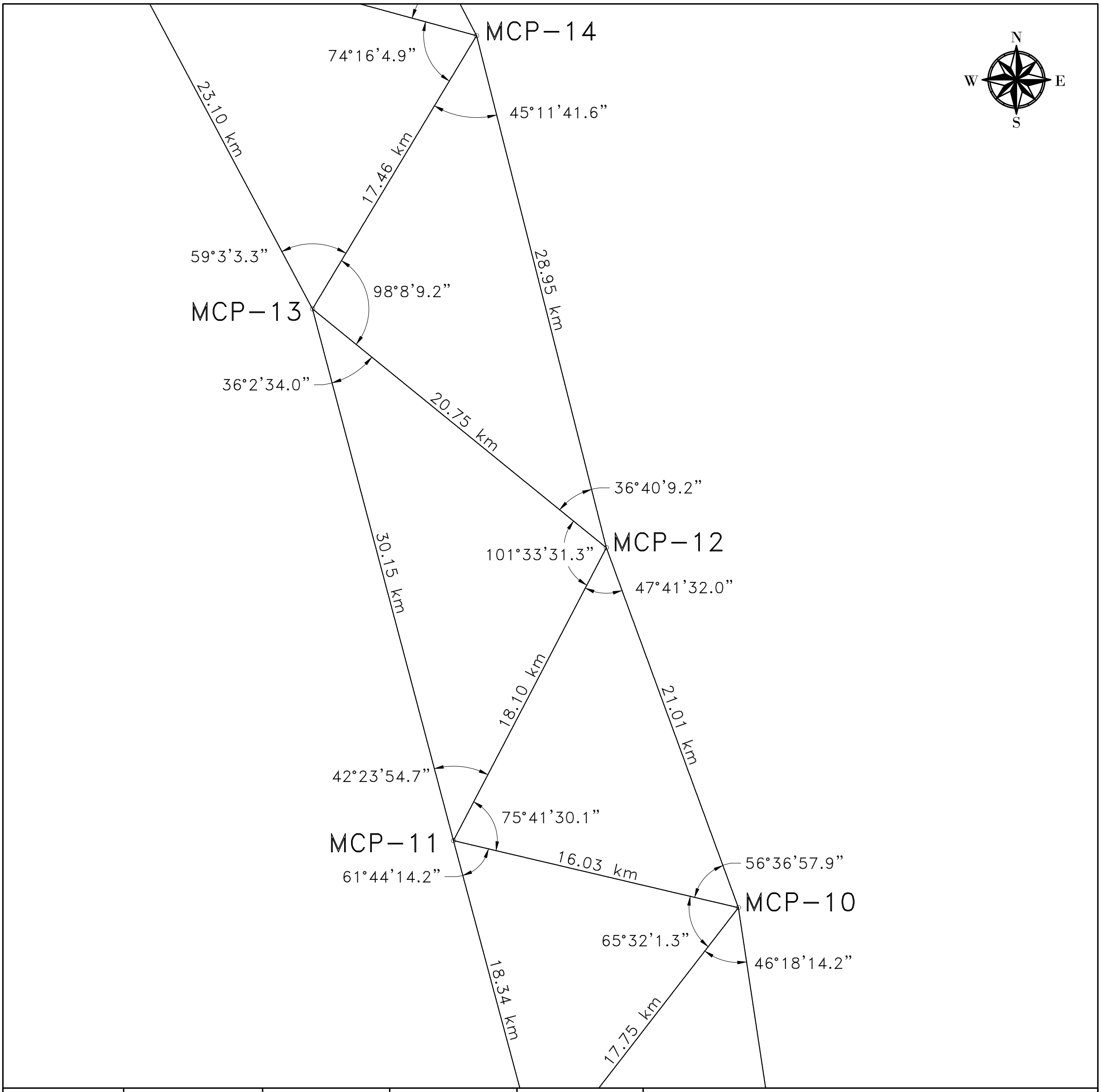


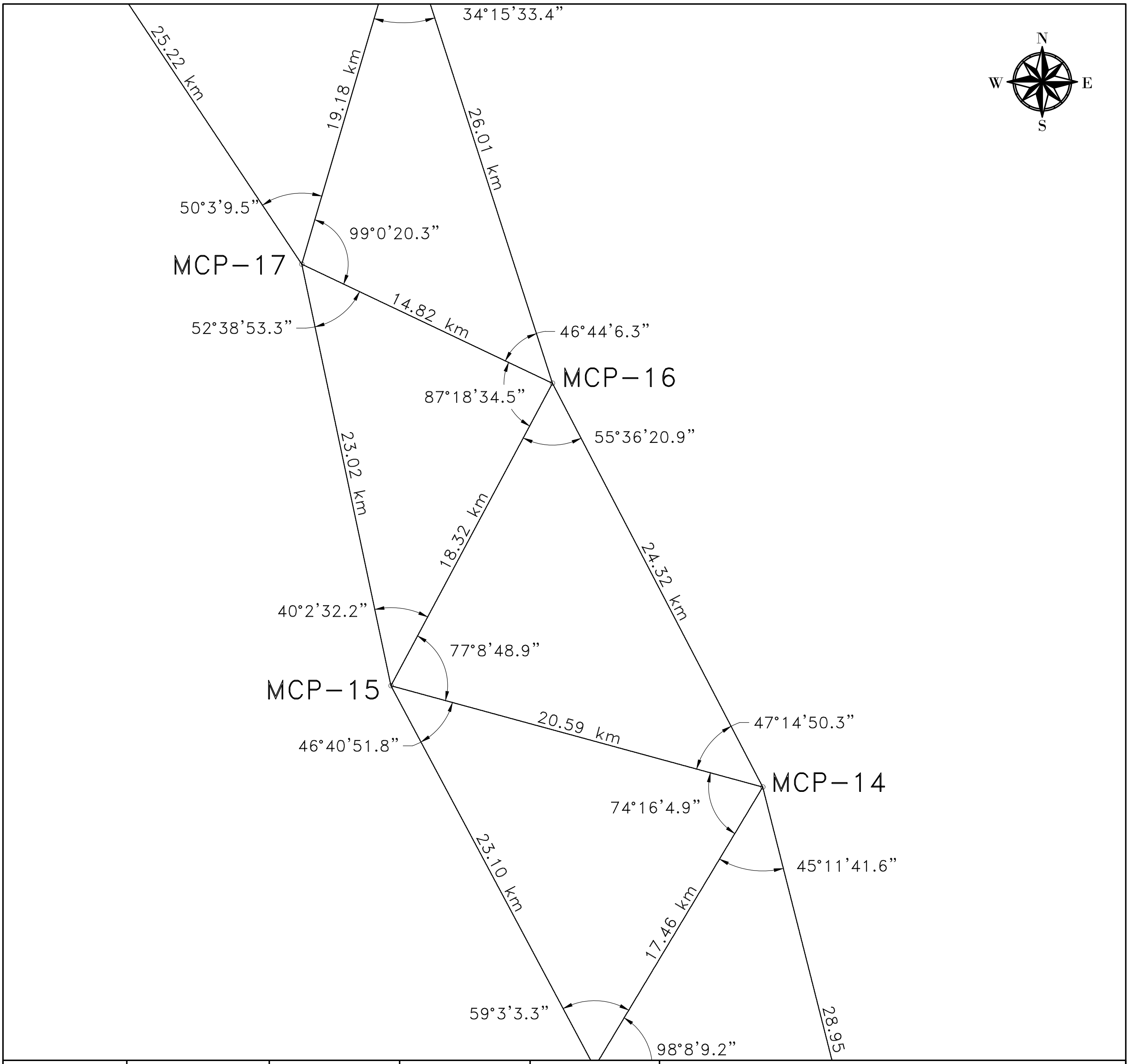
ID	X	Y	Line	Bearing	Description
MCP-01	713141.204	935309.608	MCP-01_MCP-02	353° 31' 19.85"	The survey station, KRDCL-01-MCP is marked with red and white paint and nail point on the top of BSF lane BT road. The survey station is near by Bemapally mosque. It is approximately 2 metres away from the flag Pole.
MCP-02	711297.215	951549.991	MCP-02_MCP-03	286° 25' 27.78"	The survey station, KRDCL-02-MCP is marked with red and white paint and nail point on the top of Maruthumoodu-Aruvikarakonam BT road . The survey station is near by Residential House no: SP8/176(20). It is approximately 8 metres away from the road junction.
MCP-03	695515.749	956202.028	MCP-03_MCP-04	31° 42' 6.43"	The survey station, KRDCL-03-MCP is marked with red and white paint and nail point on the top of Chillaroor-Vallakada BT road . The survey station is parallel Mutalapozhi river in Thazhampalli. It is approximately 14 metres away from the electric pole.
MCP-04	704390.419	970570.343	MCP-04_MCP-05	281° 9' 48.63"	The survey station, KRDCL-04-MCP is marked with red and white paint and nail point on the top of concrete slab covering a drain on the side of the Malayodam-Pappala BT road. The survey station is near by drain to the side of Malayamadom-Pappla Road. It is approximately 22 metres away from the telephone pole.
MCP-05	684207.962	974553.220	MCP-05_MCP-06	32° 51' 46.35"	The survey station, KRDCL-05-MCP is marked with red and white paint and nail point on the top of road . The survey station is near by railway cross on the Parapally-Paravur road. It is approximately 13 metres away from the Mahadev automobile.



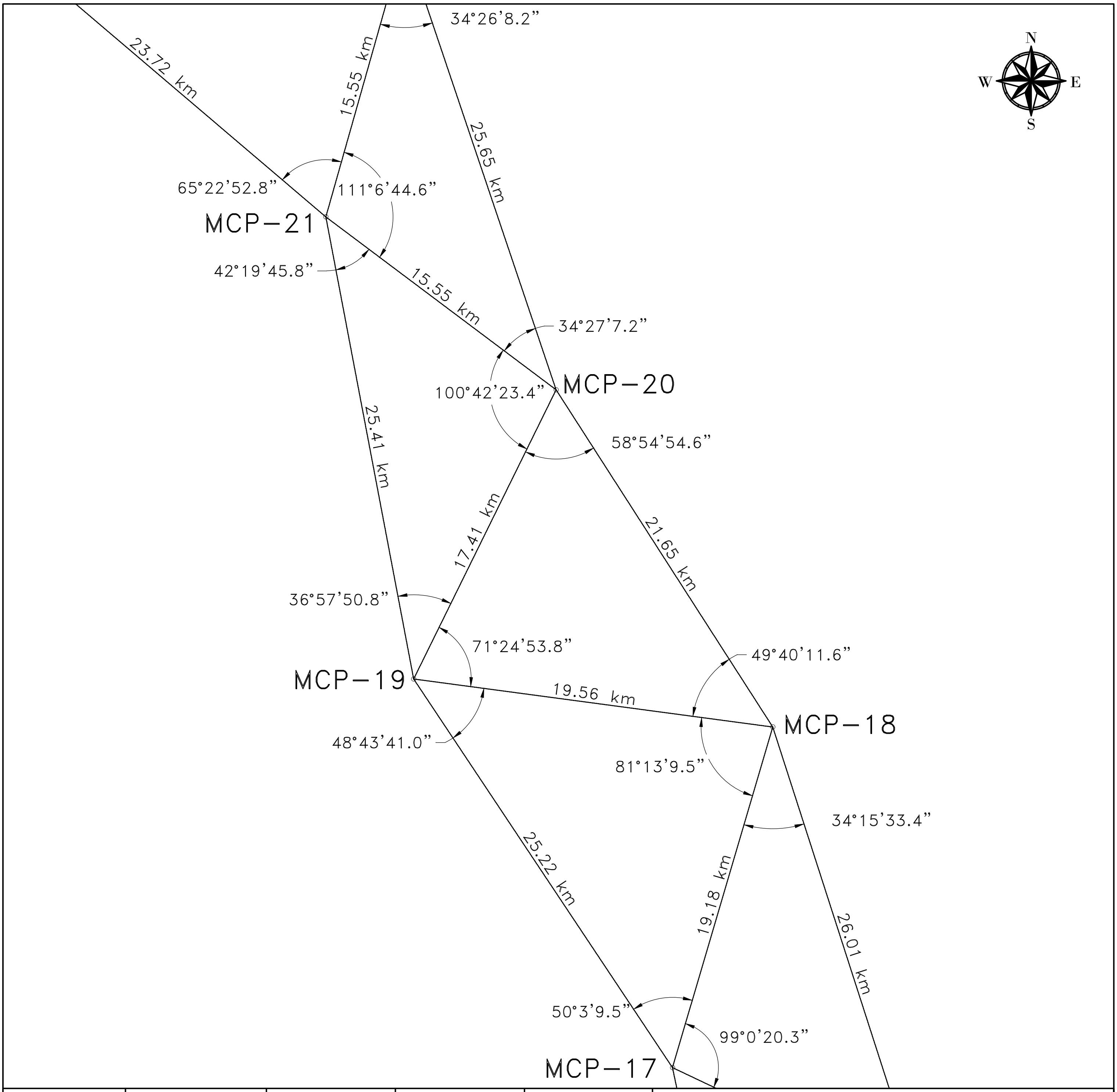
ID	X	Y	Line	Bearing	Description
MCP-06	692134.854	986823.756	MCP-06_MCP-07	310° 41' 35.23"	The survey station, KRDCL-06-MCP is marked with red and white paint and nail point on the top of Ambalakunnu-Kundara BT Road . The survey station is near by Nedumankavu - Veliyam Road. It is approximately 6 metres away from the electric pole.
MCP-07	677243.985	999628.814	MCP-07_MCP-08	41° 15' 11.30"	The survey station, KRDCL-07-MCP is marked with red and white paint and nail point on the top of Railway staion BT road that leads to the ICS junction railway station. The survey station is near by Chavara - Sasthamkotta Road. It is approximately 1 metres away from the flag Pole.
MCP-08	689116.882	1013165.762	MCP-08_MCP-09	308° 38' 7.50"	The survey station, KRDCL-08-MCP is marked with red and white paint and nail point on the top of culvert to the side of the Adoor-Charrumoodu BT road. The survey station is near by Adoor Federal bank. It is approximately 1.5 metres away from the flag Pole.
MCP-09	674353.732	1024965.979	MCP-09_MCP-10	37° 42' 51.89"	The survey station, KRDCL-09-MCP is marked with red and white paint and nail point on the top of Mavellikara-Chengannur-Kozhelchery BT Road . The survey station is near by bridge on SH10 in Cheriyanad. It is approximately 31 metres away from the Ponni Stores.



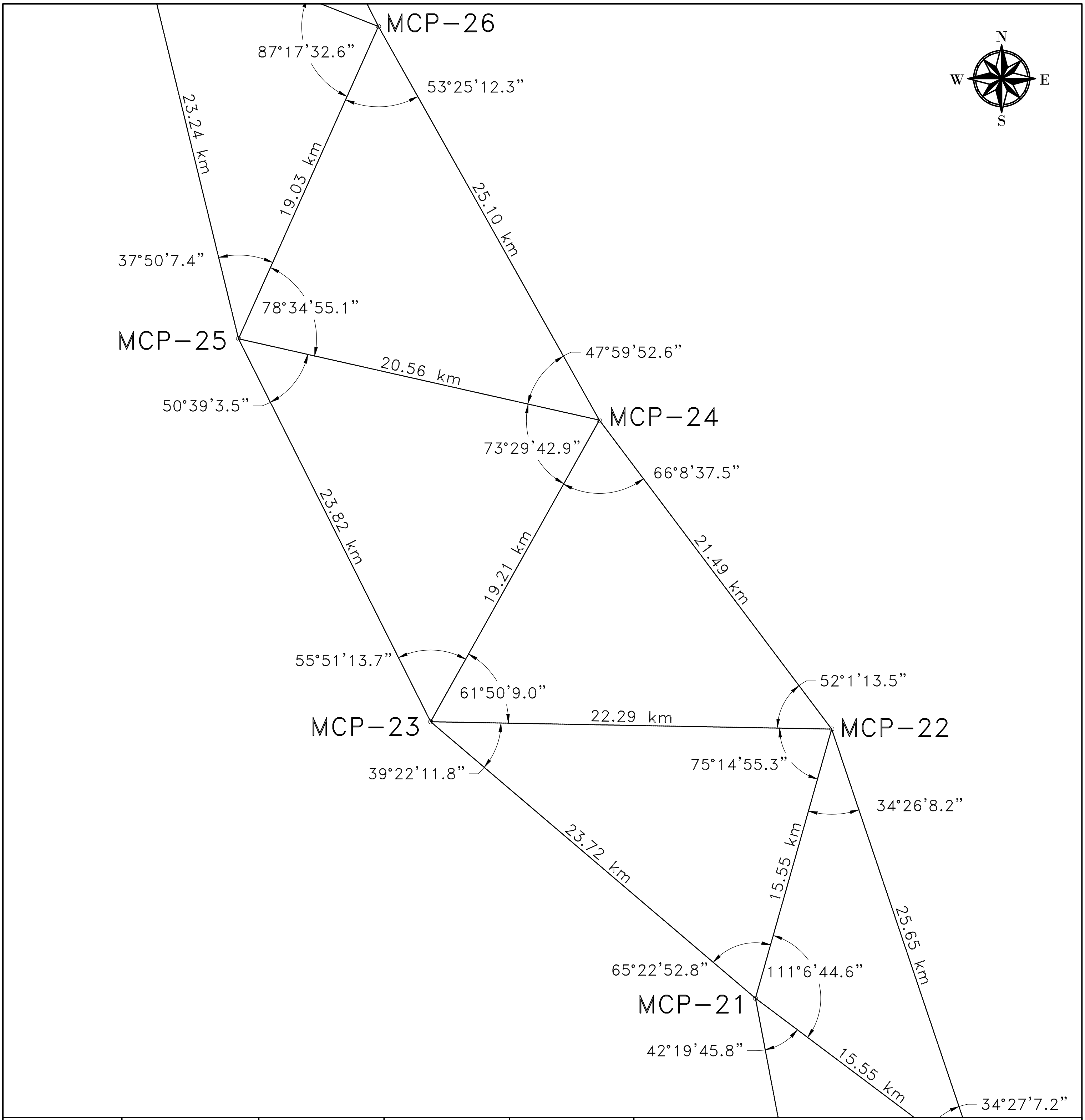
ID	X	Y	Line	Bearing	Description
MCP-10	685213.252	1039009.253	MCP-10_MCP-11	283° 14' 53.17"	The survey station, KRDCL-10-MCP is marked with red and white paint and nail point on the top of BT road . The survey station is near by residential bulding on the side of Podippara - Nellimala Road. It is approximately 200 metres away from the Government Hospital.
MCP-11	669601.127	1042684.875	MCP-11_MCP-12	27° 33' 23.09"	The survey station, KRDCL-11-MCP is marked with red and white paint and nail point on the top of Kollam-Theni highway BT road . The survey station is near by Perunna bus stop. It is approximately 13 metres away from the solar powered Lamp post.
MCP-12	677978.904	1058739.819	MCP-12_MCP-13	309° 6' 54.42"	The survey station, KRDCL-12-MCP is marked with red and white paint and nail point on the top of culvert on the side of Kottayam-Pambady BT road. The survey station is near by Residential House no: 60 in Pampady village. It is approximately 1 metres away from the wooden telephone pole.
MCP-13	661877.078	1071832.473	MCP-13_MCP-14	30° 58' 45.24"	The survey station, KRDCL-13-MCP is marked with red and white paint and nail point on the top of the old bridge on top of Kallara river Parallel to Kumarakonam-Cumbom BT road. The survey station is near by Kallara river bridge in Perumthuruth. It is approximately 18 metres away from the electric pole.



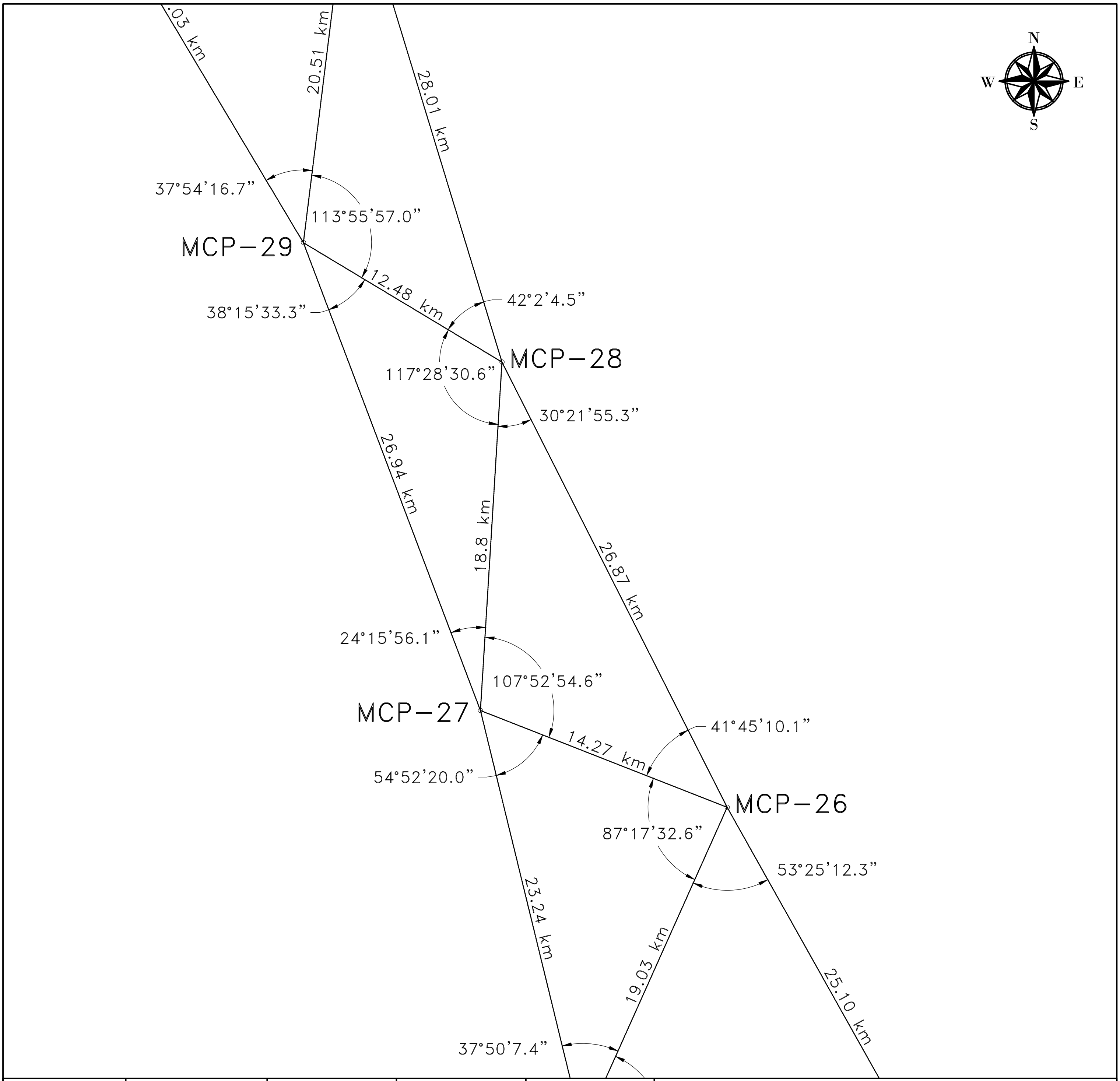
ID	X	Y	Line	Bearing	Description
MCP-14	670868.251	1086808.590	MCP-14_MCP-15	285° 14' 50.13"	The survey station, KRDCL-14-MCP is marked with red and white paint and nail point on the top of culvert on the side of the Thalayolaparambu-Koothattukulam BT road. The survey station is near by Residential building in Muttathupuram. It is approximately 2 metres away from the telephone pole.
MCP-15	651002.129	1092223.695	MCP-15_MCP-16	28° 6' 1.26"	The survey station, KRDCL-15-MCP is marked with red and white paint and nail point to the side of the junction between the Ettmanoor-Ernakulam BT Road and Udayamperoor BT Road . The survey station is near by Udayamperamboor colony Bus Stop. It is approximately 8 metres away from the Sachu stores.
MCP-16	659632.646	1108386.980	MCP-16_MCP-17	295° 24' 35.76"	The survey station, KRDCL-16-MCP is marked with red and white paint and nail point on the top of culvert on the side of the Ernakuolam-Thekkady BT road. The survey station is near by Chengara-Chirangara mosque. It is approximately 15 metres away from the power tools shop.
MCP-17	646237.838	1114750.149	MCP-17_MCP-18	16° 24' 15.43"	The survey station, KRDCL-17-MCP is marked with red and white paint and nail point on the top of Bridge of the Idamoola BT road on top of the Muttar river . The survey station is near by Edamula Masjid. It is approximately 1 metres away from the lamp post.



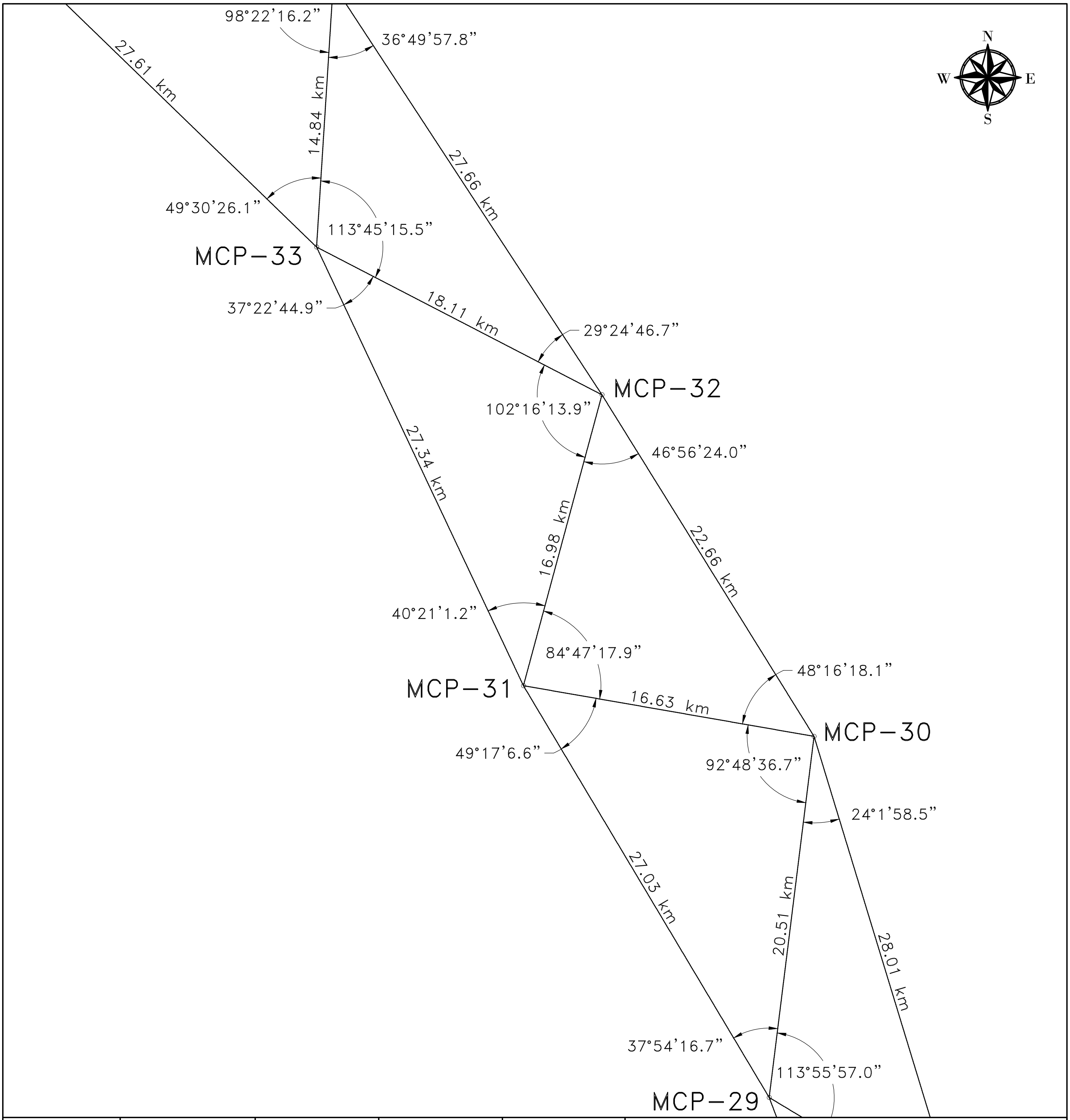
ID	X	Y	Line	Bearing	Description
MCP-18	651655.268	1133151.913	MCP-18_MCP-19	277° 37' 24.94"	The survey station, KRDCL-18-MCP is marked with red and white paint and nail point on the top of culvert to the side of a village BT road. The survey station is near by Vargesh market in Karukutty vilage. It is approximately 25 metres away from the transformer.
MCP-19	632261.534	1135747.719	MCP-19_MCP-20	26° 12' 31.18"	The survey station, KRDCL-19-MCP is marked with red and white paint and nail point on the top of culvert on the side of the Kodunallur-Shornur BT road. The survey station is near by Karupadanna Masjid. It is approximately 1 metres away from the name board.
MCP-20	639953.733	1151374.367	MCP-20_MCP-21	306° 54' 54.61"	The survey station, KRDCL-20-MCP is marked with red and white paint and nail point on the top of culvert on the side of the Shantinagar-Kuttumuck-Kuttiyal BT road. The survey station is near by Pudukad bus stop. It is approximately 5 metres away from the residential building.
MCP-21	627518.700	1160716.003	MCP-21_MCP-22	15° 48' 10.04"	The survey station, KRDCL-21-MCP is marked with red and white paint and nail point on the top of road junction formed between Vadanapally-Kanjany-Thrissur BT road and Manakkodi Pullu BT road . The survey station is near by Manakadi Bus stop. It is approximately 3 metres away from the telephone pole.



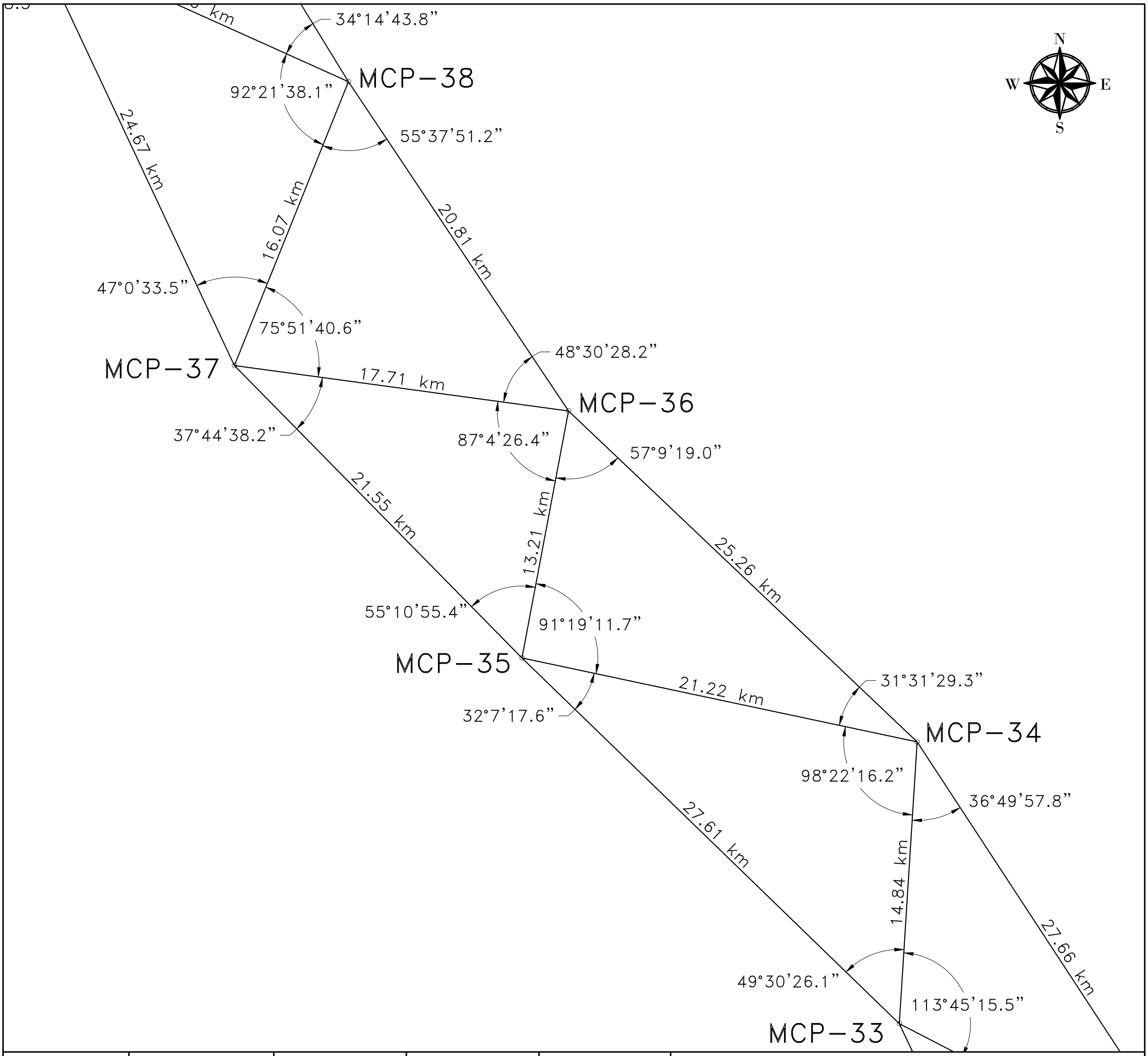
ID	X	Y	Line	Bearing	Description
MCP-22	631755.971	1175687.422	MCP-22_MCP-23	271° 3' 5.37"	The survey station, KRDCL-22-MCP is marked with red and white paint and nail point on the top of concrete slab across the Puzhakkal river parallel to the Athani-Thiruthiparambu BT road. The survey station is near by Thiruthu-Paramba Road in Atanai Village. It is approximately 21 metres away from the pump Shed.
MCP-23	609460.213	1176096.639	MCP-23_MCP-24	29° 12' 56.38"	The survey station, KRDCL-23-MCP is marked with red and white paint and nail point on the top of culvert on top of a nala and on the side of the Punnayoor BT road. The survey station is near by Puriyanoor panchayat office. It is approximately 46 metres away from the Post office.
MCP-24	618841.057	1192870.915	MCP-24_MCP-25	282° 42' 39.23"	The survey station, KRDCL-24-MCP is marked with red and white paint and nail point on the top of culvert. The survey station is near by Farm house in Pattitara. It is approximately 50 metres away from the Ponmani-Palakad BT road.
MCP-25	598776.177	1197396.741	MCP-25_MCP-26	24° 7' 44.17"	The survey station, KRDCL-25-MCP is marked with red and white paint and nail point on the top of retaining structure. The survey station is near by Kattedaipalli Masjid. It is approximately 100 metres away from the Purathur Service Sahakarna Bank.



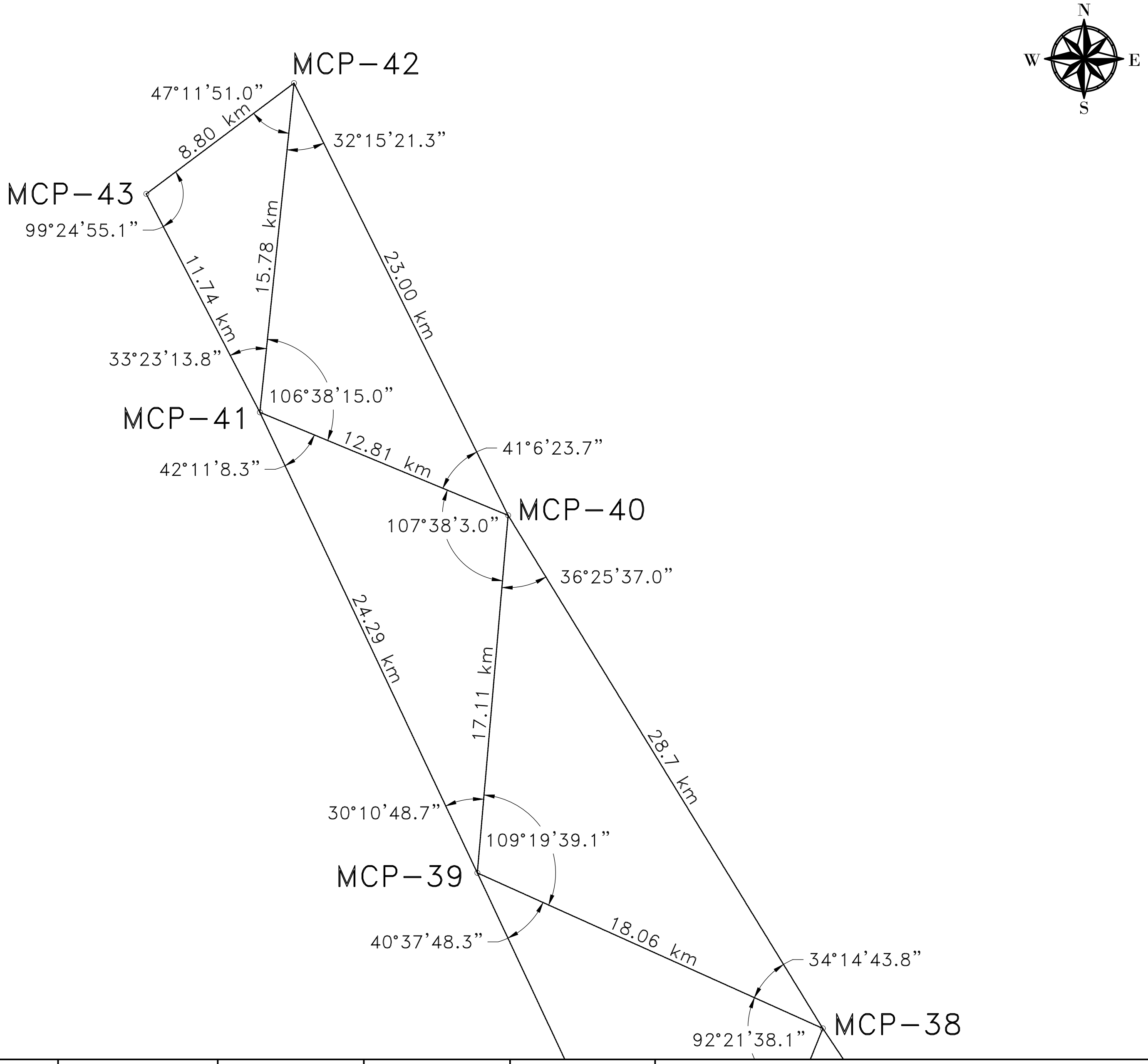
ID	X	Y	Line	Bearing	Description
MCP-26	606557.328	1214768.179	MCP-26_MCP-27	291° 25' 16.72"	The survey station, KRDCL-26-MCP is marked with red and white paint and nail point on the top of a Village BT road. The survey station is near by Turkish Global Furniture in Permanna Village. It is approximately 50 metres away from the Thrissur-Malappuram BT road.
MCP-27	593267.785	1219981.997	MCP-27_MCP-28	3° 32' 22.10"	The survey station, KRDCL-27-MCP is marked with red and white paint and nail point on the top of bridge over the Tippusulthan BT road . The survey station is near by Badriyya Jumma Masjid. It is approximately 100 metres away from the Aviyal Valiya Jumma Masjid.
MCP-28	594428.769	1238751.705	MCP-28_MCP-29	301° 0' 52.71"	The survey station, KRDCL-28-MCP is marked with red and white paint and nail point on the top of bridge of the Kottakal-Alapuzha BT road . The bridge stands across the Chaliyar River. It is approximately 70 metres away from the Standard Cars.
MCP-29	583732.147	1245182.605	MCP-29_MCP-30	7° 4' 55.71"	The survey station, KRDCL-29-MCP is marked with red and white paint and nail point on the top of retaining structure on the side of the mud road leading towards the beach from the Beach BT road. The survey station is near by KSES Employees society in Kozhikode. It is approximately 50 metres away from the building under construction.



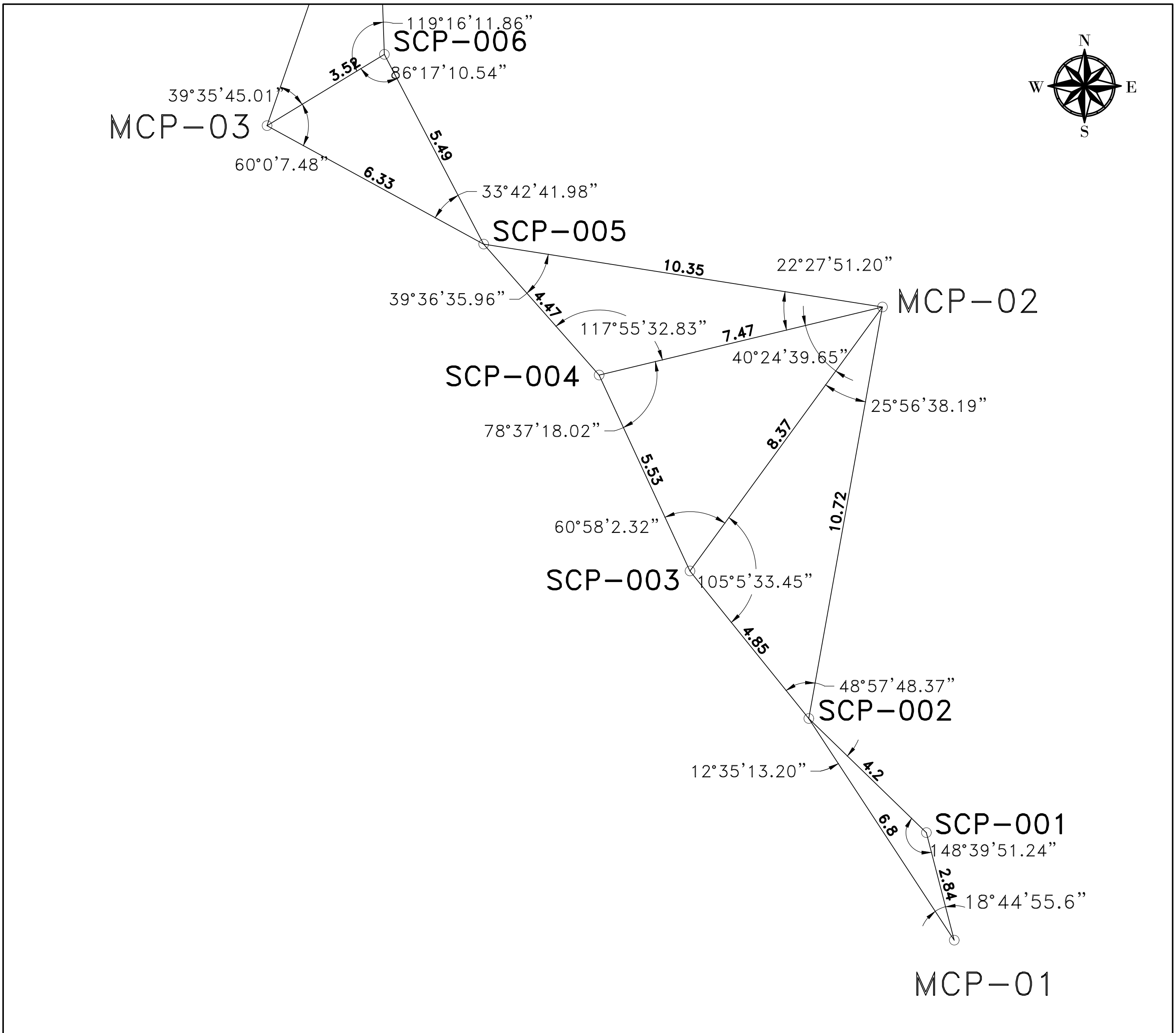
ID	X	Y	Line	Bearing	Description
MCP-30	586262.096	1265545.989	MCP-30_MCP-31	279° 53' 32.45"	The survey station, KRDCL-30-MCP is marked with red and white paint and nail point near a culvert on the top of the Koyilandy-Thamaraserry BT road . The survey station is near by Parambinate bus stop. It is approximately 15 metres away from the IRC bakery .
MCP-31	569877.471	1268403.309	MCP-31_MCP-32	15° 6' 14.60"	The survey station, KRDCL-31-MCP is marked with red and white paint and nail point on the top of H.W bridge over the NH66 BT Road . The survey station is near by Chinagapuram bus stop. It is approximately 16 metres away from the Freekzz beauty parlour.
MCP-32	574304.244	1284805.041	MCP-32_MCP-33	297° 22' 28.45"	The survey station, KRDCL-32-MCP is marked with red and white paint and nail point on the top of culvert to the side of the Ayancherry-Thiruvallur BT road. The survey station is near by General store in Ayanchery Village. It is approximately 8 metres away from the temple.
MCP-33	558214.746	1293135.987	MCP-33_MCP-34	3° 37' 12.96"	The survey station, KRDCL-33-MCP is marked with red and white paint and nail point on the top of culvert to the side of the Mahe Beach BT road. The survey station is near by NH66 on Parakkal Village. It is approximately 30 metres away from the Police station.



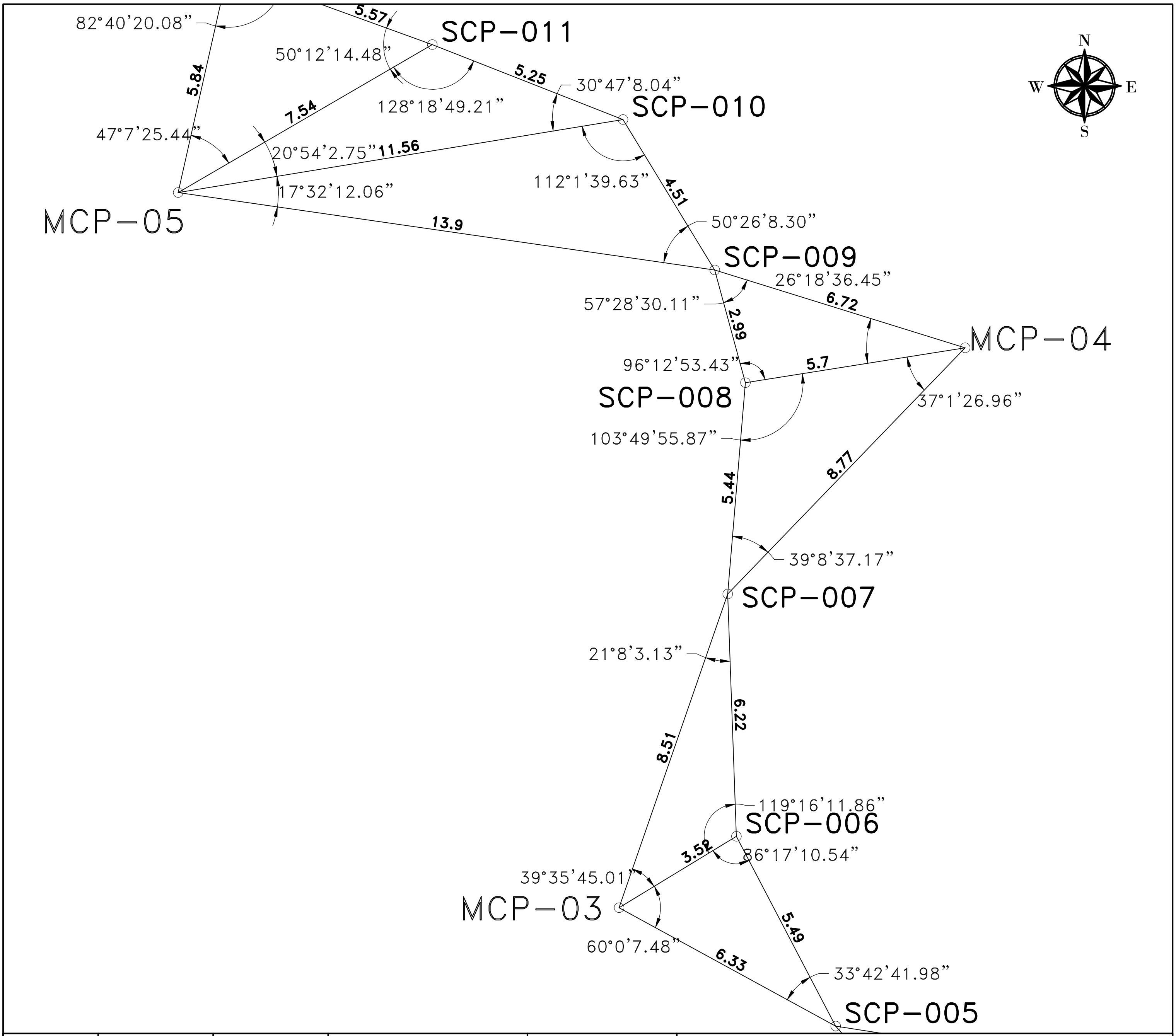
ID	X	Y	Line	Bearing	Description
MCP-34	559151.972	1307949.151	MCP-34_MCP-35	281° 59' 29.19"	The survey station, KRDCL-34-MCP is marked with red and white paint and nail point on the top of base of the well. The well is on the side of the Chovva-Kuthuparamba BT Road. It is approximately 10 metres away from the residential building.
MCP-35	538386.341	1312359.780	MCP-35_MCP-36	10° 40' 17.48"	The survey station, KRDCL-35-MCP is marked with red and white paint and nail point on the top of bridge of the Bayamballam beach BT road . The survey station is near by Payambalam Crematorium. It is approximately 40 metres away from the footpath.
MCP-36	540832.897	1325343.178	MCP-36_MCP-37	277° 44' 43.88"	The survey station, KRDCL-36-MCP is marked with red and white paint and nail point on the top of culvert near the junction of the EMS BT road on the Tali Paramba-Kannur BT Road. The survey station is near by Coffee day Shop in Aroli Village. It is approximately 50 metres away from the petrol station.
MCP-37	523275.266	1327731.269	MCP-37_MCP-38	21° 53' 3.31"	The survey station, KRDCL-37-MCP is marked with red and white paint and nail point on the top of culvert on the side of the Ettikukulam beach BT road. The survey station is near by near a shop on the Ettikulam beach. It is approximately 120 metres away from the sea shore.
MCP-38	529268.741	1342652.355	MCP-38_MCP-39	294° 14' 41.42"	The survey station, KRDCL-38-MCP is marked with red and white paint and nail point on the top of culvert on the side of the Mathil-Perul-Mathamangalam BT road. The survey station is near by Pullupura Bus stop. It is approximately 20 metres away from the residential building.



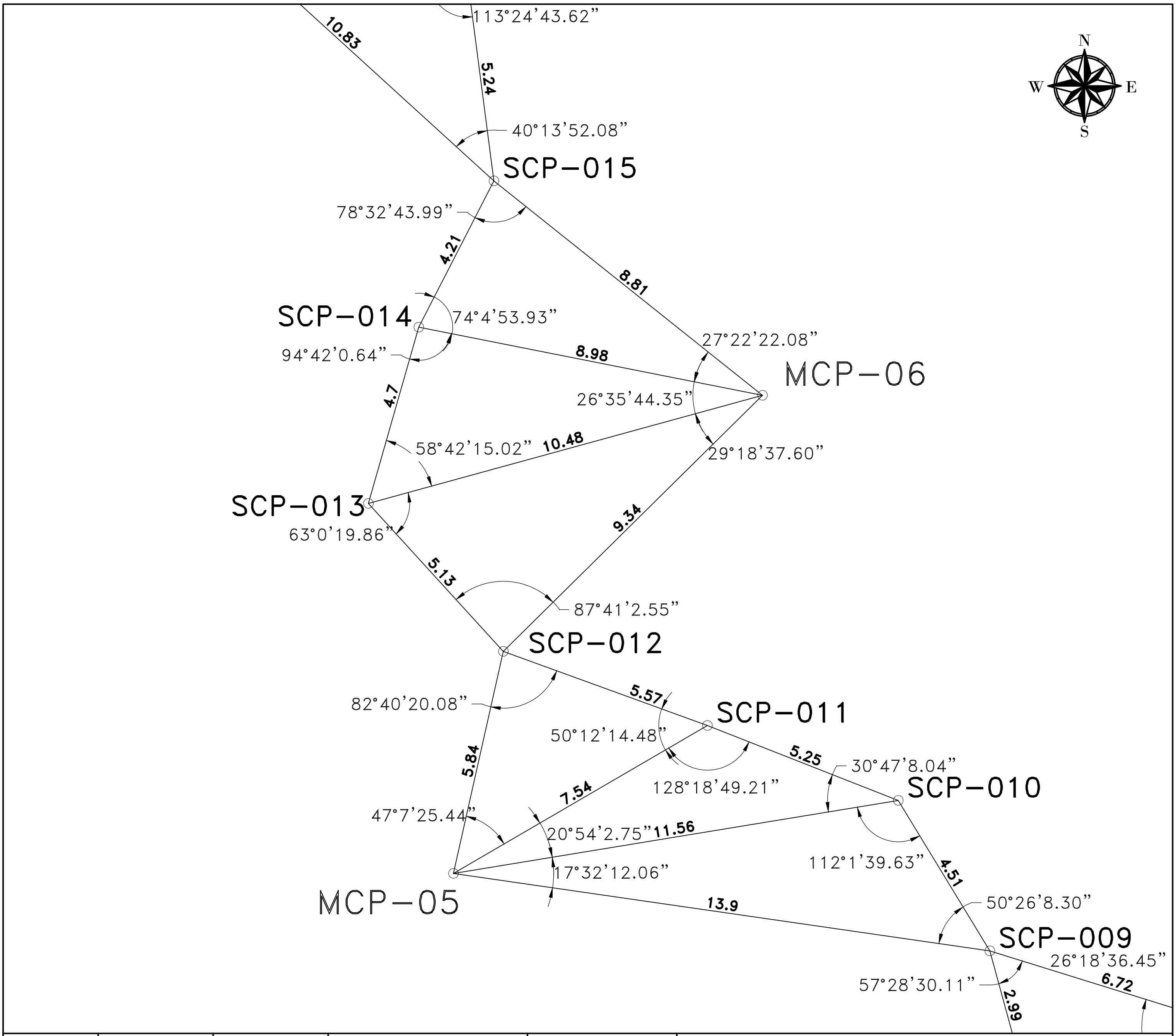
ID	X	Y	Line	Bearing	Description
MCP-39	512799.361	1350069.485	MCP-39_MCP-40	4° 55' 2.29"	The survey station, KRDCL-39-MCP is marked with red and white paint and nail point on the top of a concrete slab covering a drainage on the side of the Azhithala BT road. The survey station is near by Alinkal Sree Batrakali Temple. It is approximately 40 metres away from the commercial building.
MCP-40	514266.661	1367124.270	MCP-40_MCP-41	292° 33' 5.31"	The survey station, KRDCL-40-MCP is marked with red and white paint and nail point on the top of culvert on the side of the Kanhangad-Rajapuram-Malom BT road. The survey station is near by Residential building in Ambalathara. It is approximately 30 metres away from the road junction.
MCP-41	502431.894	1372038.852	MCP-41_MCP-42	5° 54' 50.35"	The survey station, KRDCL-41-MCP is marked with red and white paint and nail point on the top of concrete slab covering a drinage on the side of the Kochi-Panvel Highway BT road. The survey station is near by Thikkannad Tyanbakeshwara Temple. It is approximately 10 metres away from the petty shop.
MCP-42	504058.432	1387741.047	MCP-42_MCP-43	233° 6' 41.39"	The survey station, KRDCL-42-MCP is marked with red and white paint and nail point on the top of culvert on the side of Vidya Nagar BT road. The survey station is near by petty shop in Kollangana Village. It is approximately 100 metres away from the mosque.
MCP-43	497015.602	1382455.350			The survey station, KRDCL-43-MCP is marked with red and white paint and nail point on the top of foot path of a local park near the Kasargod Beach. The survey station is near by Kasargod Light house. It is approximately 20 metres away from the transformer.



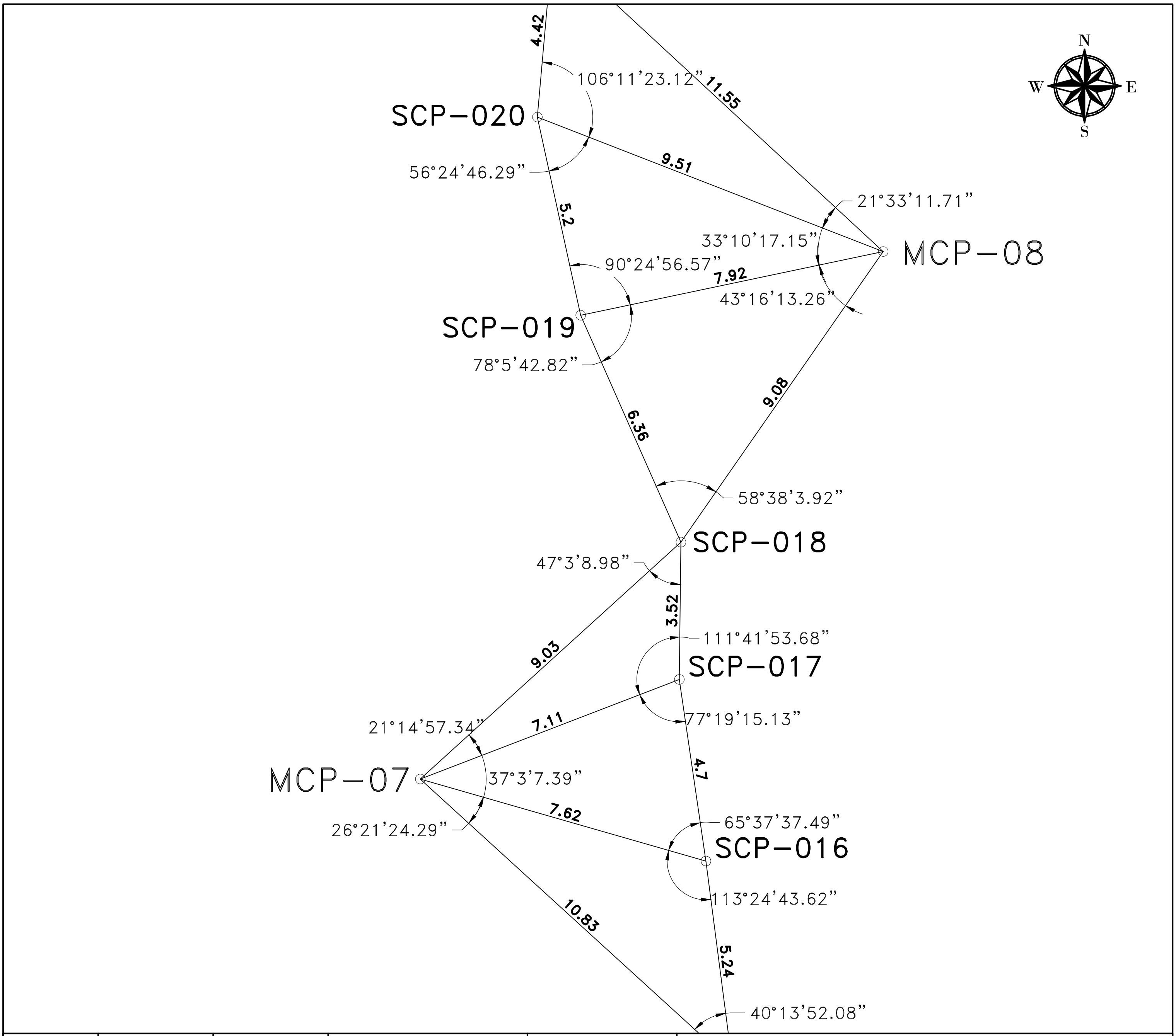
ID	X	Y	Line	Bearing	Description
SCP-001	712425.956	938068.370	SCP-001_SCP-002	314° 7' 46.24"	The survey station, KRDCL-001-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Karali road. The survey station is near by shibu agencies,korali. It is approximately 2 metres away from the Parvathi Puthan river.
SCP-002	709408.815	940995.198	SCP-002_SCP-003	321° 10' 48.92"	The survey station, KRDCL-002-SCP is marked with red and white paint and nail point on the top of the Parvathi Puthan River BT road. The survey station is near by parvathi puthan river. It is approximately 10 metres away from the electric pole.
SCP-003	706363.127	944780.598	SCP-003_SCP-004	335° 7' 13.15"	The survey station, KRDCL-003-SCP/TCP is marked with white circular paint and nail point on the top of the corner of the BT road. The survey station is near by residential building,thumba. It is approximately 5 metres away from the railway track.
SCP-004	704032.694	949805.752	SCP-004_SCP-005	318° 34' 22.29"	The survey station, KRDCL-004-SCP is marked with red and white paint and nail point on the top of the Kanniyapuram railway staion BT road. The survey station is near by raiway station,kaniyapuram. It is approximately 5 metres away from the railway track.
SCP-005	701070.033	953163.024	SCP-005_SCP-006	332° 23' 48.32"	The survey station, KRDCL-005-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Chiriyankeezhu-Kanniyapuram road. The survey station is near by junction, nellmood koyhinada road. It is approximately 70 metres away from the railway track.



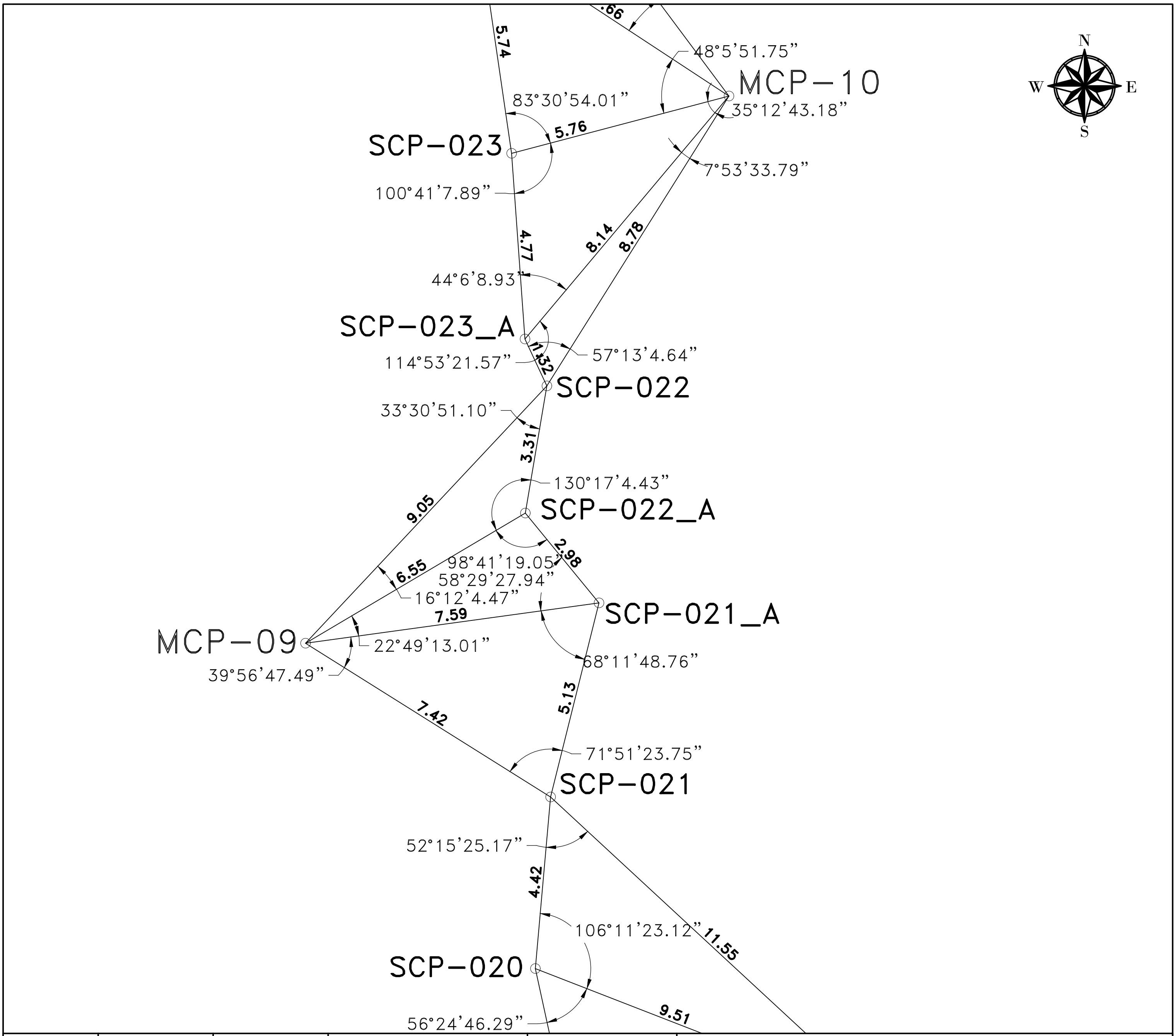
ID	X	Y	Line	Bearing	Description
SCP-006	698524.067	958032.336	SCP-006_SCP-007	357° 57' 10.72"	The survey station, KRDCL-006-SCP is marked with red and white paint and nail point on the top of the Kizhuvilam Service Co-Operative bank road BT road. The survey station is near by kattumarakkal jumma masjid. It is approximately 70 metres away from the bhahmapuri temple.
SCP-007	698301.716	964253.248	SCP-007_SCP-008	4° 48' 5.90"	The survey station, KRDCL-007-SCP/TCP is marked with white circular paint and nail point on the top of the Alamcode-kadakkavoor-Anchutengu BT road. The survey station is near by bus stop,kadakkvoor. It is approximately 2 metres away from the electric pole.
SCP-008	698757.153	969675.042	SCP-008_SCP-009	344° 45' 16.60"	The survey station, KRDCL-008-SCP is marked with red and white paint and nail point on the top of the Kallabalam-Puthusarimukku-Killimanoor BT road. The survey station is near by tailor shop,puthuserinkku. It is approximately 20 metres away from the electric pole.
SCP-009	697968.699	972567.975	SCP-009_SCP-010	328° 38' 41.97"	The survey station, KRDCL-009-SCP is marked with red and white paint and nail point on the top of the culvert on the side of the Navikkal-Pallikal BT road. The survey station is near by csi church,maruthi kunnu. It is approximately 2 metres away from the electric pole.
SCP-010	695617.209	976427.145	SCP-010_SCP-011	291° 27' 29.64"	The survey station, KRDCL-010-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Paripally-Valamanoor Road. The survey station is near by residential building,valamanoor. It is approximately 70 metres away from the government school.



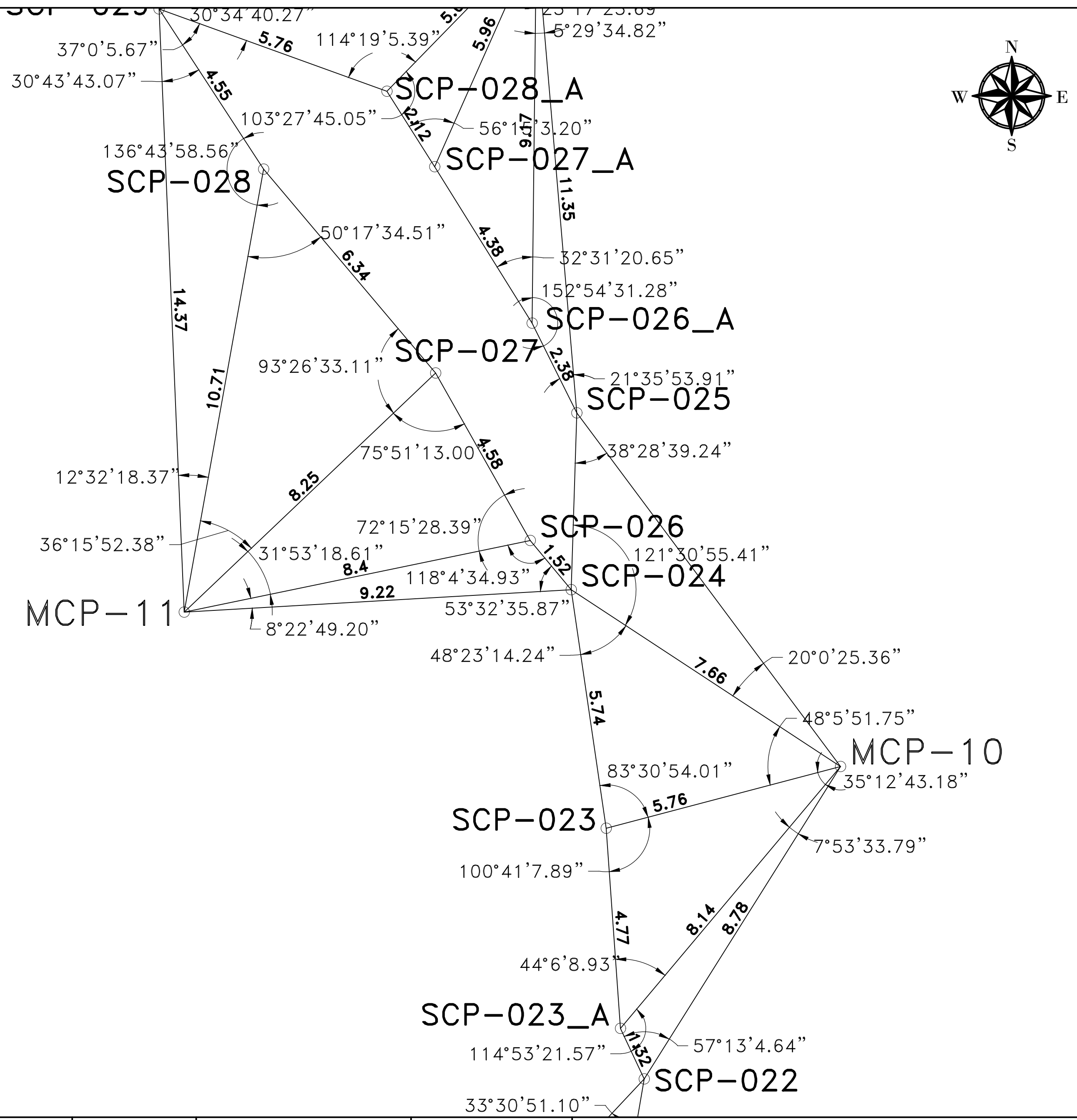
ID	X	Y	Line	Bearing	Description
SCP-011	690724.603	978350.275	SCP-011_SCP-012	289° 58' 33.33"	The survey station, KRDCL-011-SCP is marked with red and white paint and nail point on the top of the Panavel-Kochi-Kanniyakumari Highway BT road. The survey station is near by quilon cooperative spinning mills,karamcode. It is approximately 50 metres away from the pulari travels.
SCP-012	685487.274	980254.015	SCP-012_SCP-013	317° 39' 12.18"	The survey station, KRDCL-012-SCP is marked with red and white paint and nail point on the top of the Panavel-Kochi-Kanniyakumari Highway BT road. The survey station is near by National highway 66. It is approximately 100 metres away from the masjid.
SCP-013	682028.403	984049.057	SCP-013_SCP-014	15° 56' 37.30"	The survey station, KRDCL-013-SCP/TCP is marked with white circular paint and nail point on the top of the concrete slab on the side of the kollam bypass river. The survey station is near by kollam nalla,mukhathala. It is approximately 20 metres away from the residential building.
SCP-014	683321.608	988575.783	SCP-014_SCP-015	27° 9' 42.74"	The survey station, KRDCL-014-SCP is marked with red and white paint and nail point on the top of the retaining wall on the side of the Kundara road. The survey station is near by residential building,keralapuram. It is approximately 20 metres away from the electric pole.
SCP-015	685245.959	992326.302	SCP-015_SCP-016	352° 36' 51.69"	The survey station, KRDCL-015-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Kanadara-Chittumala Road. The survey station is near by kannimel bus stop. It is approximately 10 metres away from the electric pole.



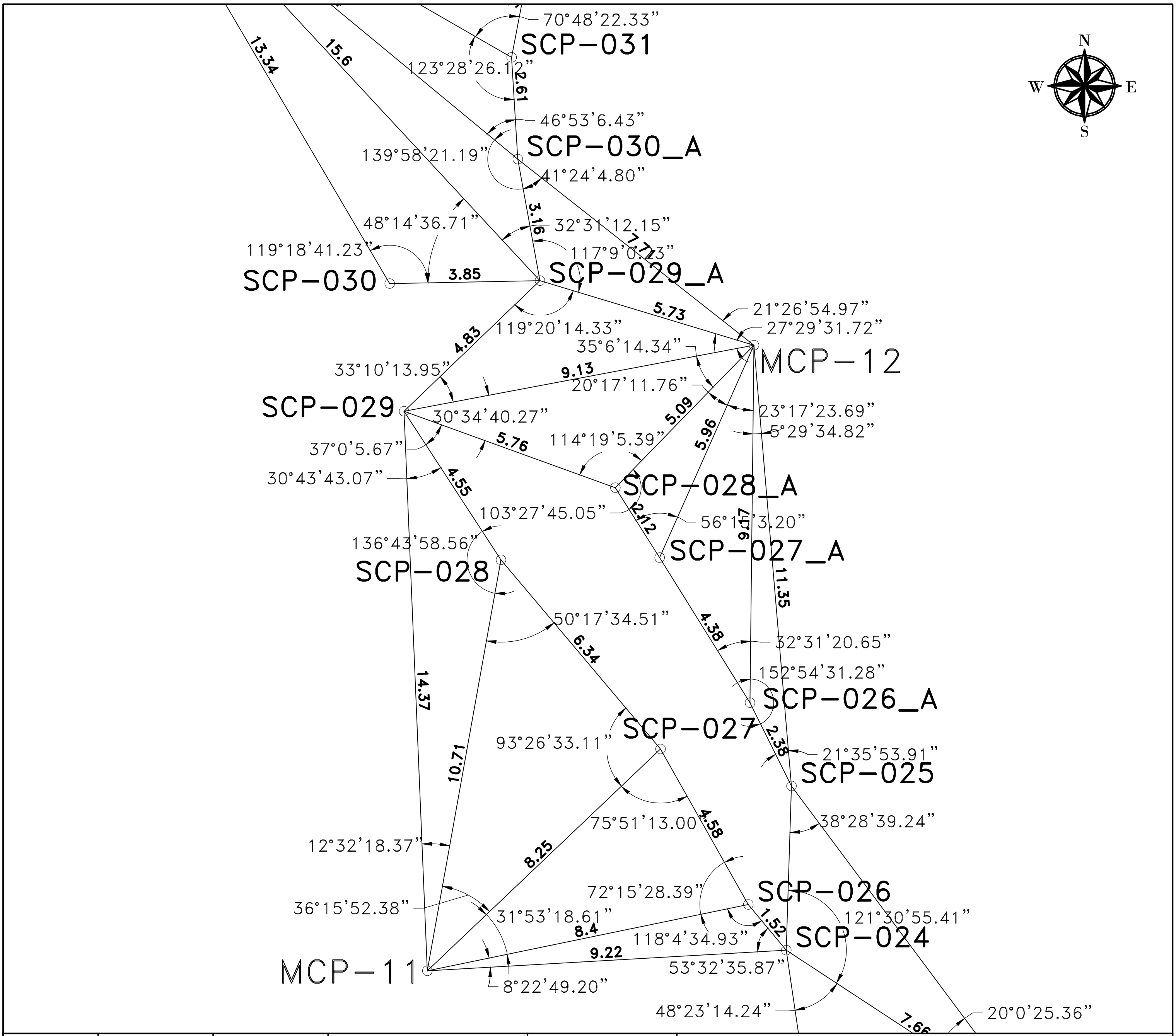
ID	X	Y	Line	Bearing	Description
SCP-016	684572.246	997523.803	SCP-016_SCP-017	351° 39' 12.80"	The survey station, KRDCL-016-SCP is marked with red and white paint and nail point on the top of the concrete slab covering a Drinage on the side of the Kaithakode-Kallada BT road. The survey station is near by royal enterprises,othiramukah. It is approximately 5 metres away from the fancy store.
SCP-017	683888.702	1002182.885	SCP-017_SCP-018	0° 40' 21.62"	The survey station, KRDCL-017-SCP is marked with red and white paint and nail point on the top of the Kotteakara-Sasthamcotta BT road. The survey station is near by happy mart super market,kunnathur. It is approximately 10 metres away from the electric pole.
SCP-018	683930.082	1005707.328	SCP-018_SCP-019	336° 10' 53.01"	The survey station, KRDCL-018-SCP/TCP is marked with white circular paint and nail point on the top of the Chakkuvally-Kadambanad BT road. The survey station is near by Edakkadu. It is approximately 100 metres away from the church.
SCP-019	681360.076	1011529.190	SCP-019_SCP-020	347° 40' 13.62"	The survey station, KRDCL-019-SCP is marked with red and white paint and nail point on the top of the village BT road. The survey station is near by sree kandalasway temple,noonanad. It is approximately 30 metres away from the electric pole.
SCP-020	680248.236	1016615.943	SCP-020_SCP-021	5° 4' 4.21"	The survey station, KRDCL-020-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Kundasandd-Bharahickauu Road. The survey station is near by residential building,kidangayam. It is approximately 5 metres away from the icds office.



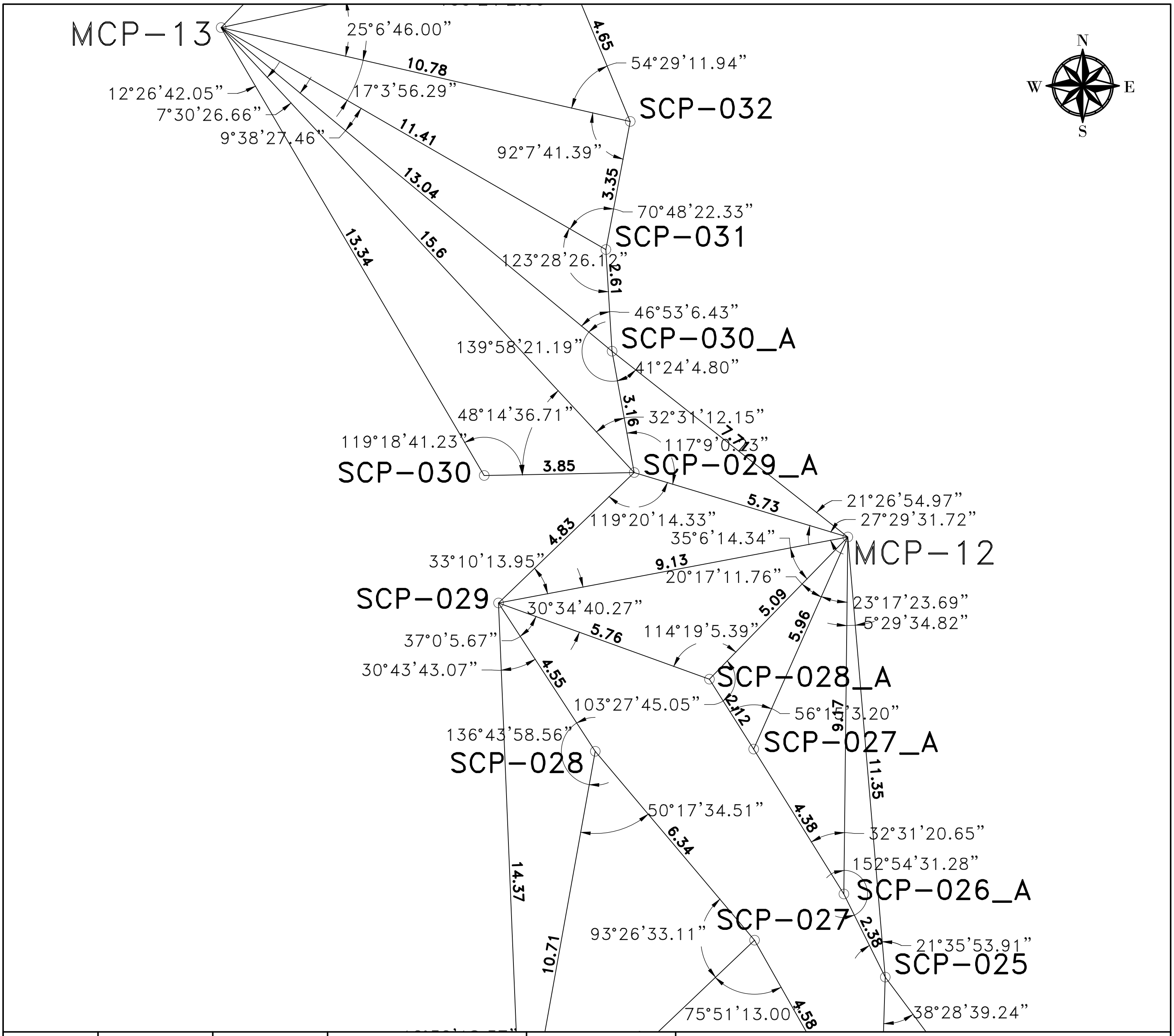
ID	X	Y	Line	Bearing	Description
SCP-021	680638.758	1021019.573	SCP-021_SCP-021_A	13° 58' 53.61"	The survey station, KRDCL-021-SCP is marked with red and white paint and nail point on the top of the Kochalammoodu-Pandalam BT road. The survey station is near by rubber garden,Ayranikudy village. It is approximately 10 metres away from the electric transformer.
SCP-021_A	681878.731	1025999.661	SCP-021_A_SCP-022_A	320° 40' 10.31"	The survey station, KRDCL-021_A-SCP is marked with red and white paint and nail point on the top of the Kottarakara-Kottayam BT road. The survey station is near by bharath petrol station,kaaraikad. It is approximately 20 metres away from the ration shop.
SCP-022	680544.452	1031568.369	SCP-022_SCP-023_A	334° 53' 18.08"	The survey station, KRDCL-022-SCP/TCP is marked with white circular paint and nail point on the top of the Movelikkona-Kozhenchery BT road. The survey station is near by Gek enterprises,Arattupuzha. It is approximately 2 metres away from the name board.
SCP-022_A	679989.956	1028304.791	SCP-022_A_SCP-022	9° 38' 33.78"	The survey station, KRDCL-022_A-SCP is marked with red and white paint and nail point on the top of the Kottarakara-Kottayam BT road. The survey station is near by Vayaloram resturant,mulakuzha. It is approximately 30 metres away from the rk vegetable shop.
SCP-023	679638.278	1037537.429	SCP-023_SCP-024	351° 41' 45.68"	The survey station, KRDCL-023-SCP is marked with red and white paint and nail point on the top of a Concrete slab on the side of the Cherukoipuzha-Kumbanad BT road. The survey station is near by Araman Bakery. It is approximately 50 metres away from the Eraviperoor post office.



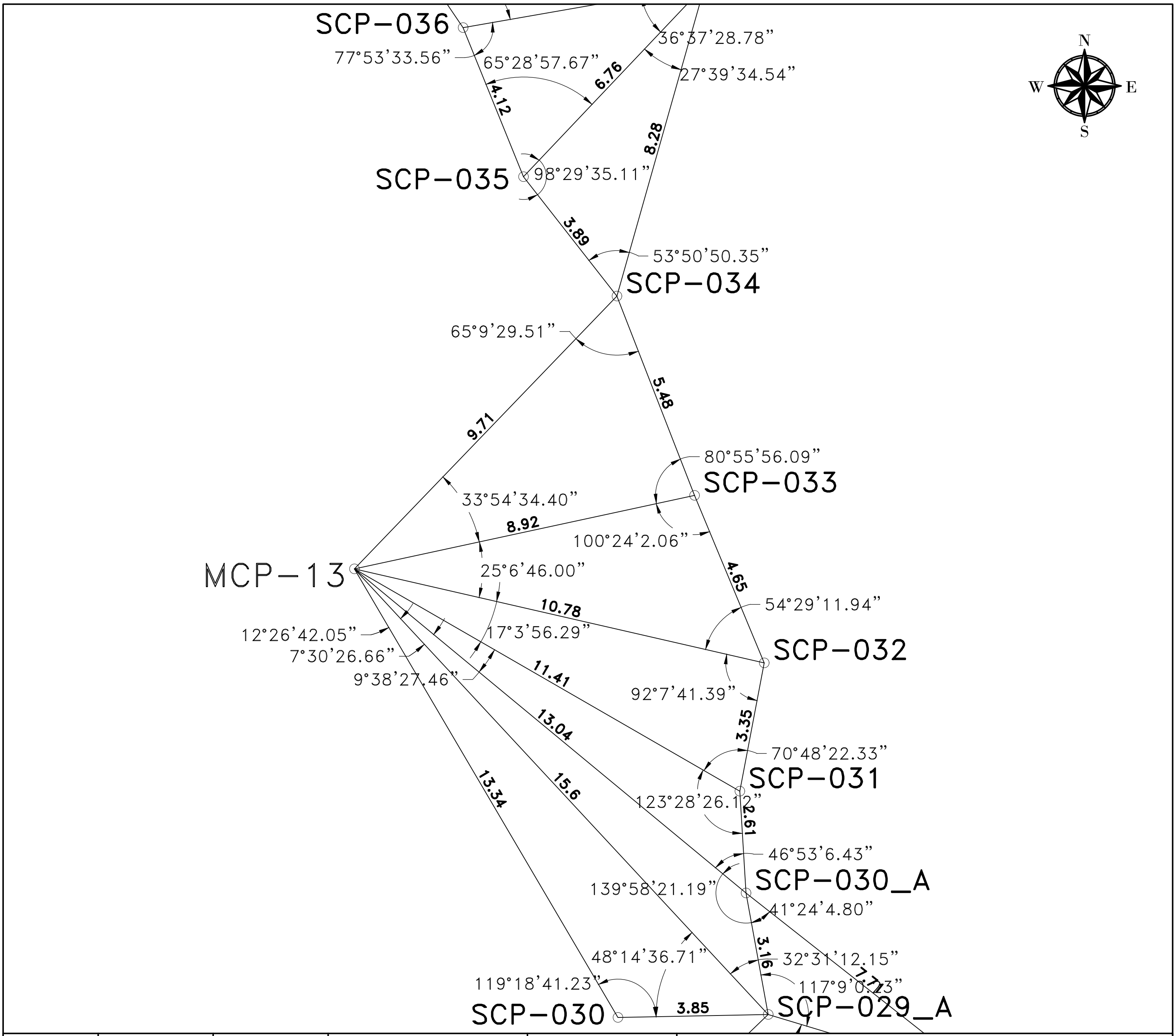
ID	X	Y	Line	Bearing	Description
SCP-023_A	679980.125	1032772.441	SCP-023_A_SCP-023	355° 53' 47.58"	The survey station, KRDCL-023_A-SCP/TCP is marked with white circular paint and nail point on the top of the road corner BT road. The survey station is near by agriculture land, Chengannur village. It is approximately 10 metres away from the residential building.
SCP-024	678809.275	1043217.277	SCP-024_SCP-025	1° 47' 36.04"	The survey station, KRDCL-024-SCP is marked with red and white paint and nail point on the top of the culvert. The survey station is on the Thituvall-Mallappally road. It is approximately 50 metres away from the electric pole.
SCP-024	678809.275	1043217.277	SCP-024_SCP-026	320° 14' 3.19"	The survey station, KRDCL-024-SCP is marked with red and white paint and nail point on the top of the culvert. The survey station is on the Thituvall-Mallappally road. It is approximately 50 metres away from the electric pole.
SCP-025	678941.137	1047428.778	SCP-025_SCP-026_A	333° 32' 21.24"	The survey station, KRDCL-025-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Mammood-Mallapally Road. The survey station is near by residential building,santhipuram. It is approximately 30 metres away from the electric pole.
SCP-026	677834.729	1044388.385	SCP-026_SCP-027	330° 34' 6.52"	The survey station, KRDCL-026-SCP is marked with red and white paint and nail point on the top of the Manthanam-Shanthipuram BT road. The survey station is near by rubber garden,Kunnamthanam. It is approximately 20 metres away from the residential building.



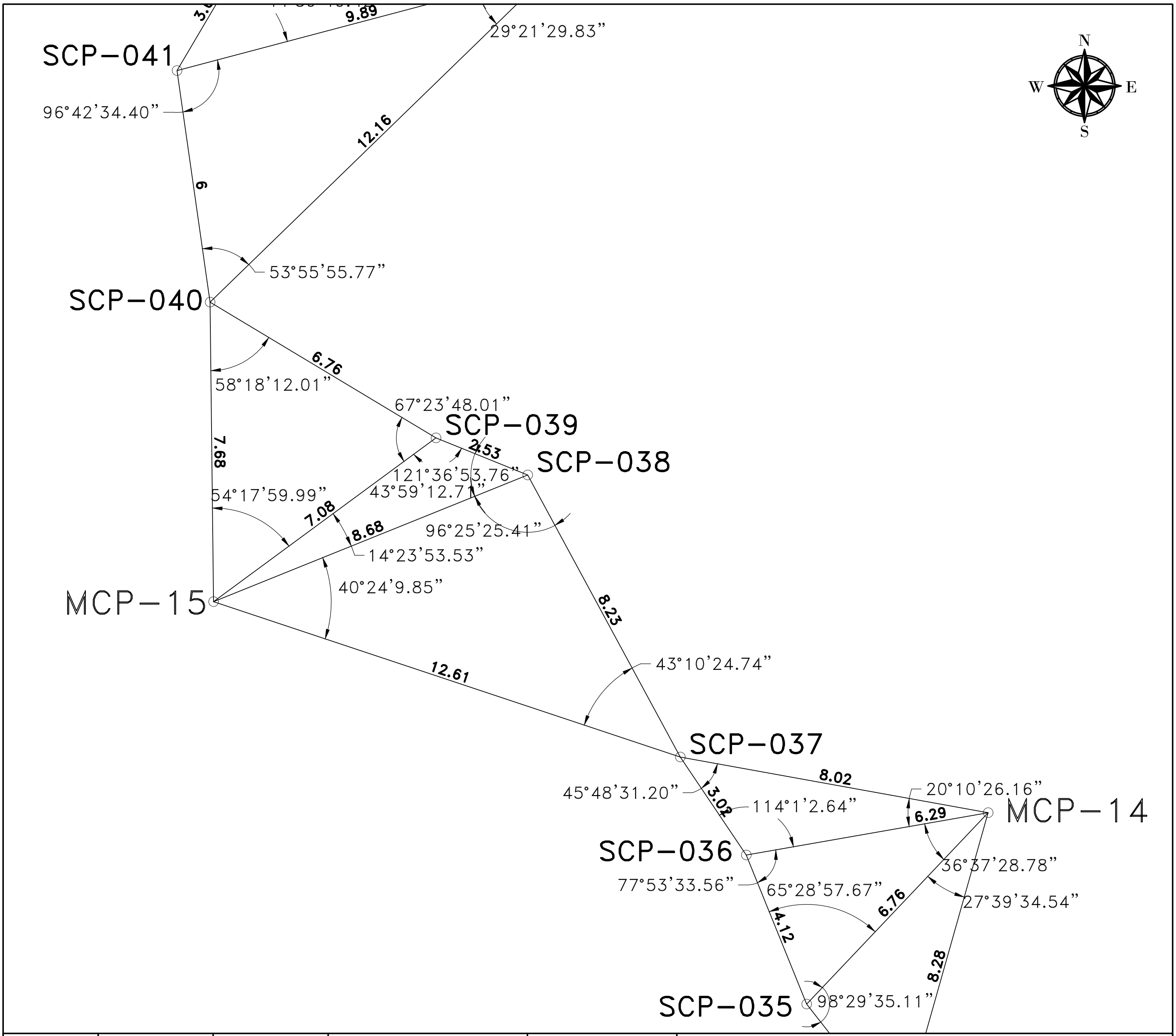
ID	X	Y	Line	Bearing	Description
SCP-026_A	677877.929	1049564.905	SCP-026_A_SCP-027_A	328° 6' 29.31"	The survey station, KRDCL-026_A-SCP is marked with red and white paint and nail point on the top of the Karukachal-Palamattam BT road. The survey station is near by karukuchal palamattom road. It is approximately 50 metres away from the electric pole.
SCP-027	675583.912	1048377.808	SCP-027_SCP-028	319° 51' 52.63"	The survey station, KRDCL-027-SCP is marked with red and white paint and nail point on the top of the foot path for the Indian oil petrol bunk. The survey station is on the side of the Changannaserry BT road. It is approximately 5 metres away from the electric pole.
SCP-027_A	675560.902	1053288.544	SCP-027_A_SCP-028_A	327° 40' 10.46"	The survey station, KRDCL-027_A-SCP is marked with red and white paint and nail point on the top of the Njaliyakuzhi-Thottackad BT road. The survey station is near by thottakad bus stop. It is approximately 50 metres away from the electric pole.
SCP-028	671490.854	1053232.383	SCP-028_SCP-029	326° 53' 25.69"	The survey station, KRDCL-028-SCP/TCP is marked with white circular paint and nail point on the top of the culvert. The culvert is on the Pallom- Njaliakhuzhi BT road. The survey station is near by pathiyapallykkadavu bridge. It is approximately 20 metres away from the tea shop.
SCP-028_A	674423.885	1055085.014	SCP-028_A_SCP-029	289° 53' 20.02"	The survey station, KRDCL-028_A-SCP is marked with red and white paint and nail point on the top of the Kottayam-Kozhencherry BT road. The survey station is near by thivenehoor road. It is approximately 50 metres away from the electric pole.



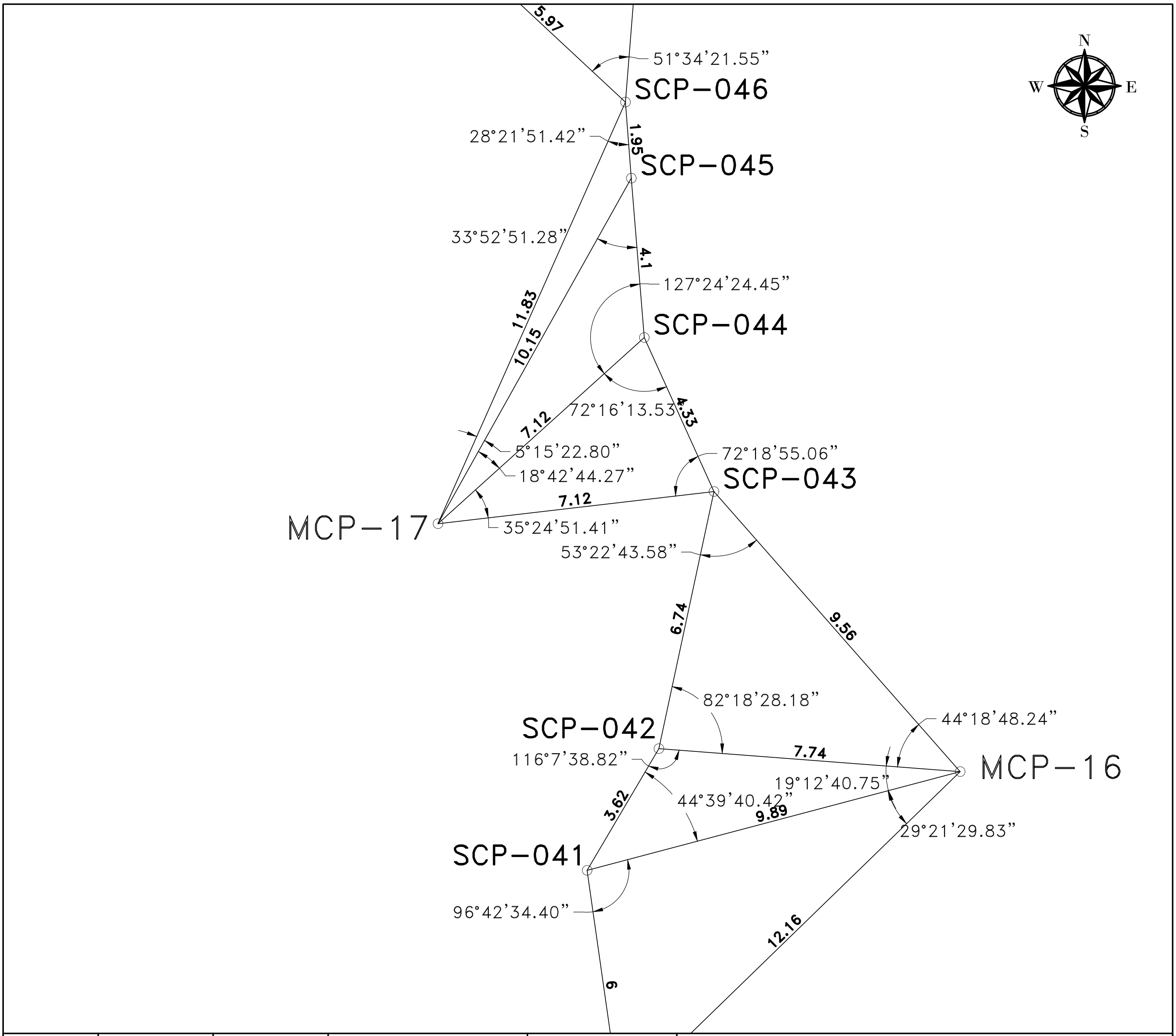
ID	X	Y	Line	Bearing	Description
SCP-029	669004.022	1057045.789	SCP-029_SCP-029_A	46° 8' 25.80"	The survey station, KRDCL-029-SCP is marked with red and white paint and nail point on the top of the Kollad-Devalokam BT road. The survey station is near by gennesarath church. It is approximately 5 metres away from the electric pole.
SCP-029_A	672491.324	1060396.950	SCP-029_A_SCP-030	268° 53' 22.38"	The survey station, KRDCL-029_A-SCP is marked with red and white paint and nail point on the top of the Kottayam-Kumily BT road. The survey station is near by kollam theni highway. It is approximately 5 metres away from the electric pole.
SCP-029_A	672491.324	1060396.950	SCP-029_A_SCP-030_A	349° 39' 11.24"	The survey station, KRDCL-029_A-SCP is marked with red and white paint and nail point on the top of the Kottayam-Kumily BT road. The survey station is near by kollam theni highway. It is approximately 5 metres away from the electric pole.
SCP-030	668636.019	1060322.221	SCP-030_SCP-029_A	88° 53' 22.38"	The survey station, KRDCL-030-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Kottayam-Kumily Road. The survey station is near by chrysoberyl hotel,kanjikuzhy. It is approximately 200 metres away from the railway track.
SCP-030_A	671922.049	1063514.965	SCP-030_A_SCP-031	356° 30' 38.87"	The survey station, KRDCL-030_A-SCP is marked with red and white paint and nail point on the top of the Eranjal-Thiruvenchoor BT road. The survey station is near by residenttial building no: 34, chettipadi village. It is approximately 10 metres away from the provisional store.



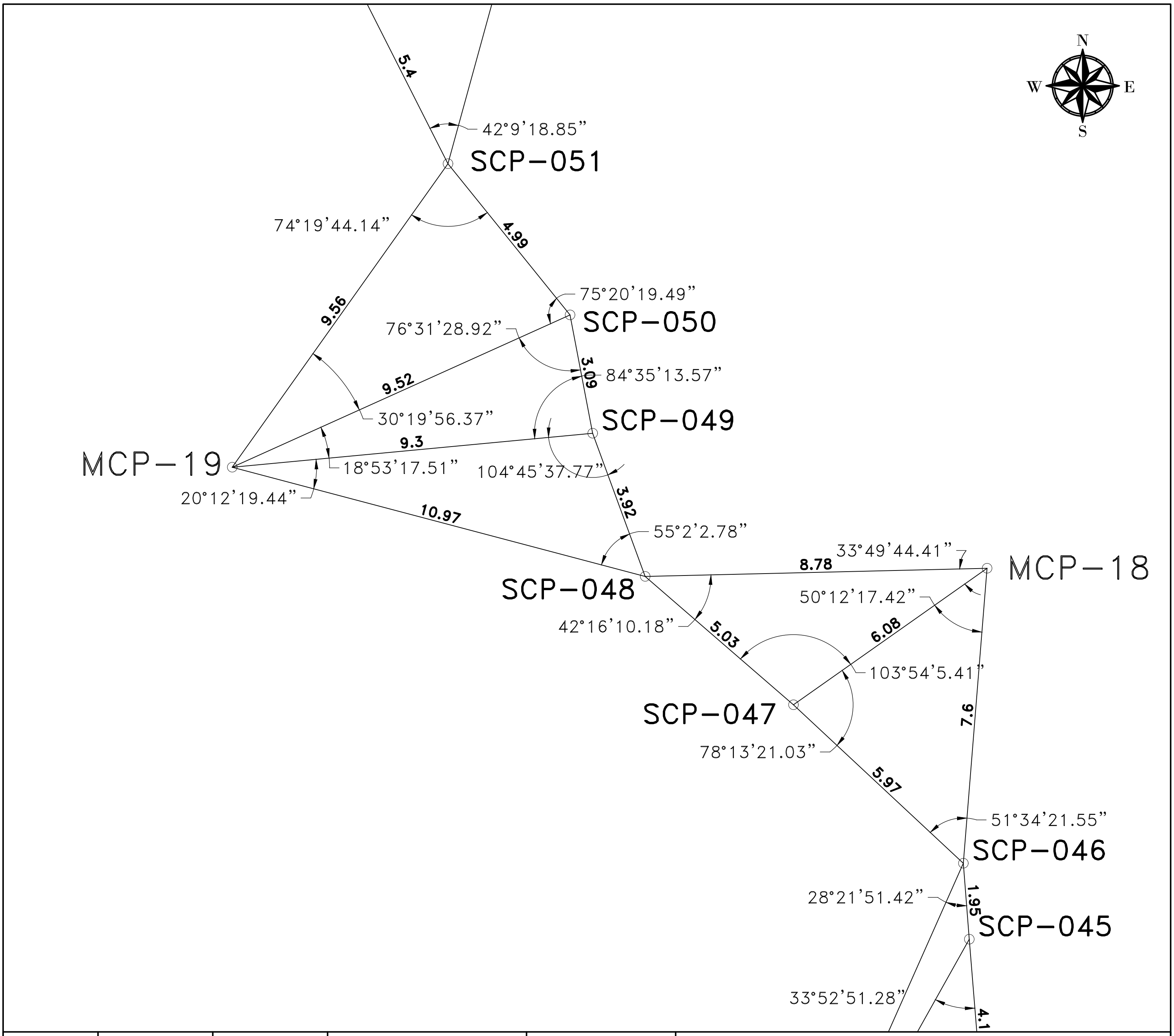
ID	X	Y	Line	Bearing	Description
SCP-031	671762.691	1066128.527	SCP-031_SCP-032	10° 47' 27.31"	The survey station, KRDCL-031-SCP is marked with red and white paint and nail point on the top of the Peroor- Ettumannur BT road. The survey station is near by vechoor kavala bus stop,peroor. It is approximately 15 metres away from the Akshya centre.
SCP-032	672390.215	1069420.958	SCP-032_SCP-033	337° 24' 20.64"	The survey station, KRDCL-032-SCP/TCP is marked with white circular paint and nail point on the top of the Ettumanoor-pala-poonjan BT road. The survey station is near by bus stop. It is approximately 30 metres away from the sign board.
SCP-033	670602.083	1073717.881	SCP-033_SCP-034	338° 44' 18.79"	The survey station, KRDCL-033-SCP is marked with red and white paint and nail point on the top of the Kannikamandabam Village BT road. The survey station is near by MC road, Vempally. It is approximately 10 metres away from the residential building.
SCP-034	668612.127	1078832.019	SCP-034_SCP-035	321° 56' 45.27"	The survey station, KRDCL-034-SCP is marked with red and white paint and nail point on the top of the Pala-Vaikom BT road. The survey station is near by pala vaikkam road. It is approximately 5 metres away from the electric pole.
SCP-035	666213.819	1081895.747	SCP-035_SCP-036	337° 58' 12.50"	The survey station, KRDCL-035-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Nieezhoor-Kaduthuruthy road. The survey station is near by residential building,njeezhoor. It is approximately 20 metres away from the electric pole.



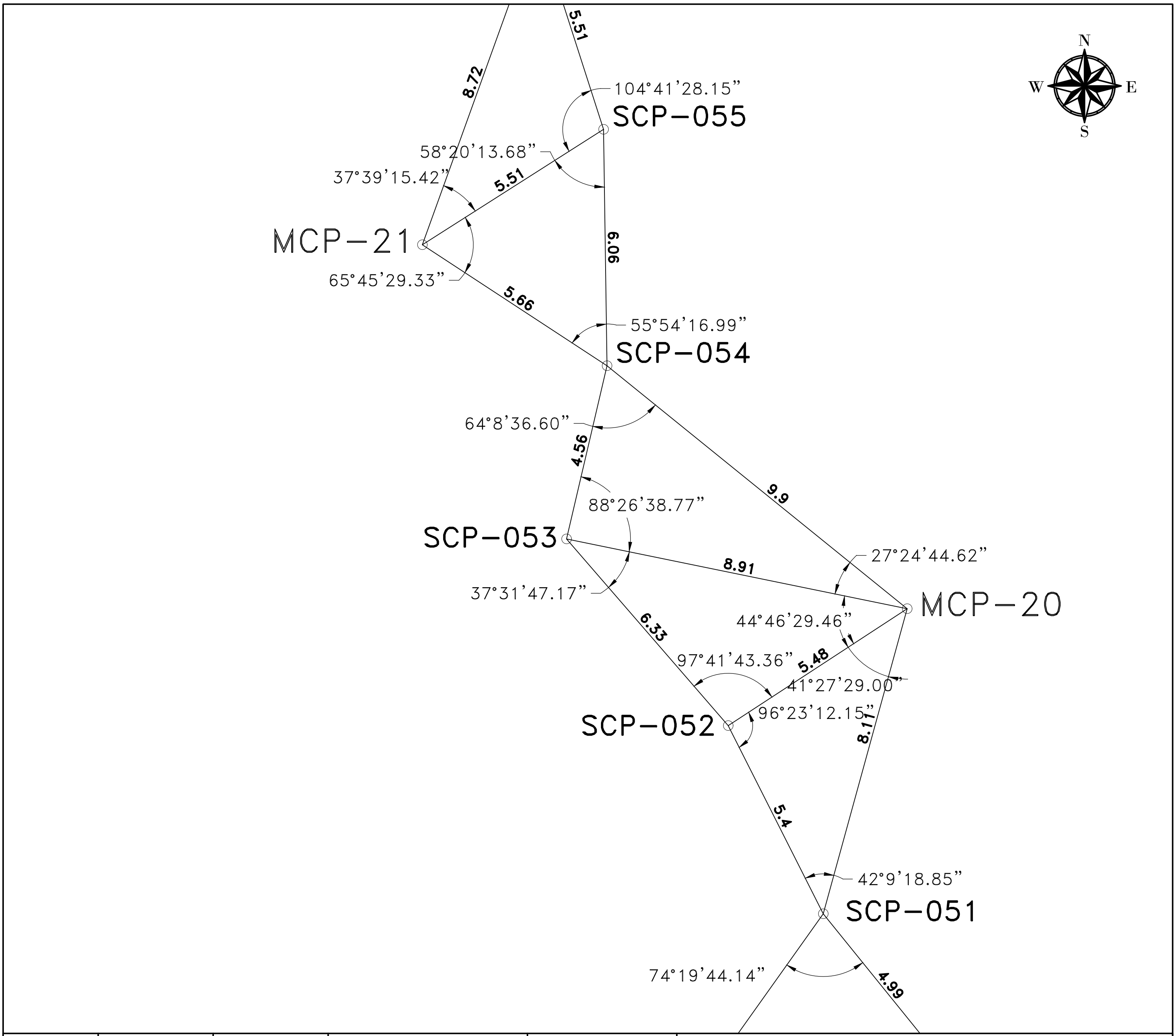
ID	X	Y	Line	Bearing	Description
SCP-036	664665.010	1085723.439	SCP-036_SCP-037	326° 3' 36.30"	The survey station, KRDCL-036-SCP is marked with red and white paint and nail point on the top of the culvert near the Kaduthuruthy-Peruva BT road. The survey station is near by soda factory,kaduthuruthy. It is approximately 2 metres away from the electric pole.
SCP-037	662973.877	1088236.327	SCP-037_SCP-038	331° 35' 40.70"	The survey station, KRDCL-037-SCP/TCP is marked with white circular paint and nail point on the top of the Vellore-Moolakulam BT road. The survey station is near by residential building,mulakulam. It is approximately 10 metres away from the electric pole.
SCP-038	659058.664	1095475.743	SCP-038_SCP-039	292° 0' 18.82"	The survey station, KRDCL-038-SCP is marked with red and white paint and nail point on the top of the Thiruvaniyoor-Maneed BT road. The survey station is near by puthumlli residential building,maneed. It is approximately 10 metres away from the super market.
SCP-039	656706.593	1096426.291	SCP-039_SCP-040	301° 1' 0.59"	The survey station, KRDCL-039-SCP is marked with red and white paint and nail point on the top of the Vettikal-Pazhukamattom BT road. The survey station is near by Saint Aphem church. It is approximately 5 metres away from the residential building.
SCP-040	650910.912	1099911.005	SCP-040_SCP-041	351° 53' 11.60"	The survey station, KRDCL-040-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Kochi-Madurai road. The survey station is near by hotel joyce,mamala. It is approximately 20 metres away from the river.



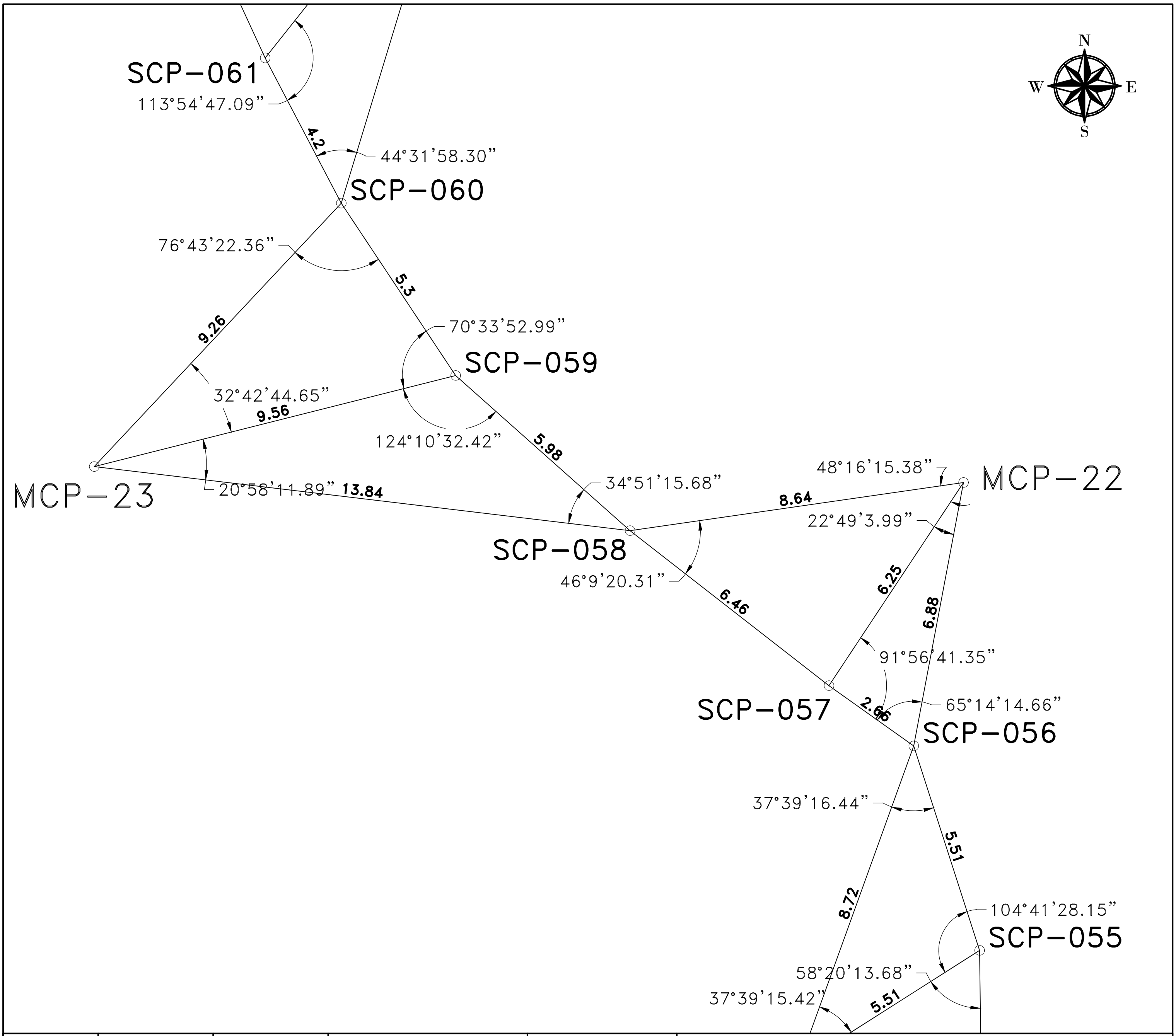
ID	X	Y	Line	Bearing	Description
SCP-041	650063.588	1105854.616	SCP-041_SCP-042	30° 30' 56.78"	The survey station, KRDCL-041-SCP is marked with red and white paint and nail point on the top of the tiled pavement on the side of the Smart city international BT road. The survey station is near by brahmapuram mosque. It is approximately 50 metres away from the little gems international school.
SCP-042	651905.710	1108979.951	SCP-042_SCP-043	12° 4' 49.78"	The survey station, KRDCL-042-SCP is marked with red and white paint and nail point on the top of the Kakkanad-Pallikara BT road. The survey station is near by kadamba river,manakkadavu. It is approximately 8 metres away from the electric pole.
SCP-043	653317.410	1115575.898	SCP-043_SCP-044	335° 39' 44.91"	The survey station, KRDCL-043-SCP/TCP is marked with white circular paint and nail point on the top of the Aluva-Munnar BT road. The survey station is near by kundali road crossing,vazhakulam village. It is approximately 10 metres away from the zain hotel.
SCP-044	651530.386	1119526.816	SCP-044_SCP-045	355° 20' 22.88"	The survey station, KRDCL-044-SCP is marked with red and white paint and nail point on the top of the Kalady-Aluva BT road. The survey station is near by house,aluva road. It is approximately 15 metres away from the electric pole.
SCP-045	651197.037	1123616.104	SCP-045_SCP-046	355° 35' 59.94"	The survey station, KRDCL-045-SCP is marked with red and white paint and nail point on the top of the Retaining structure on the side of the village BT road. The survey station is near by karyad-airport-mattoor road,nedumbassery village. It is approximately 5 metres away from the railway crossing.



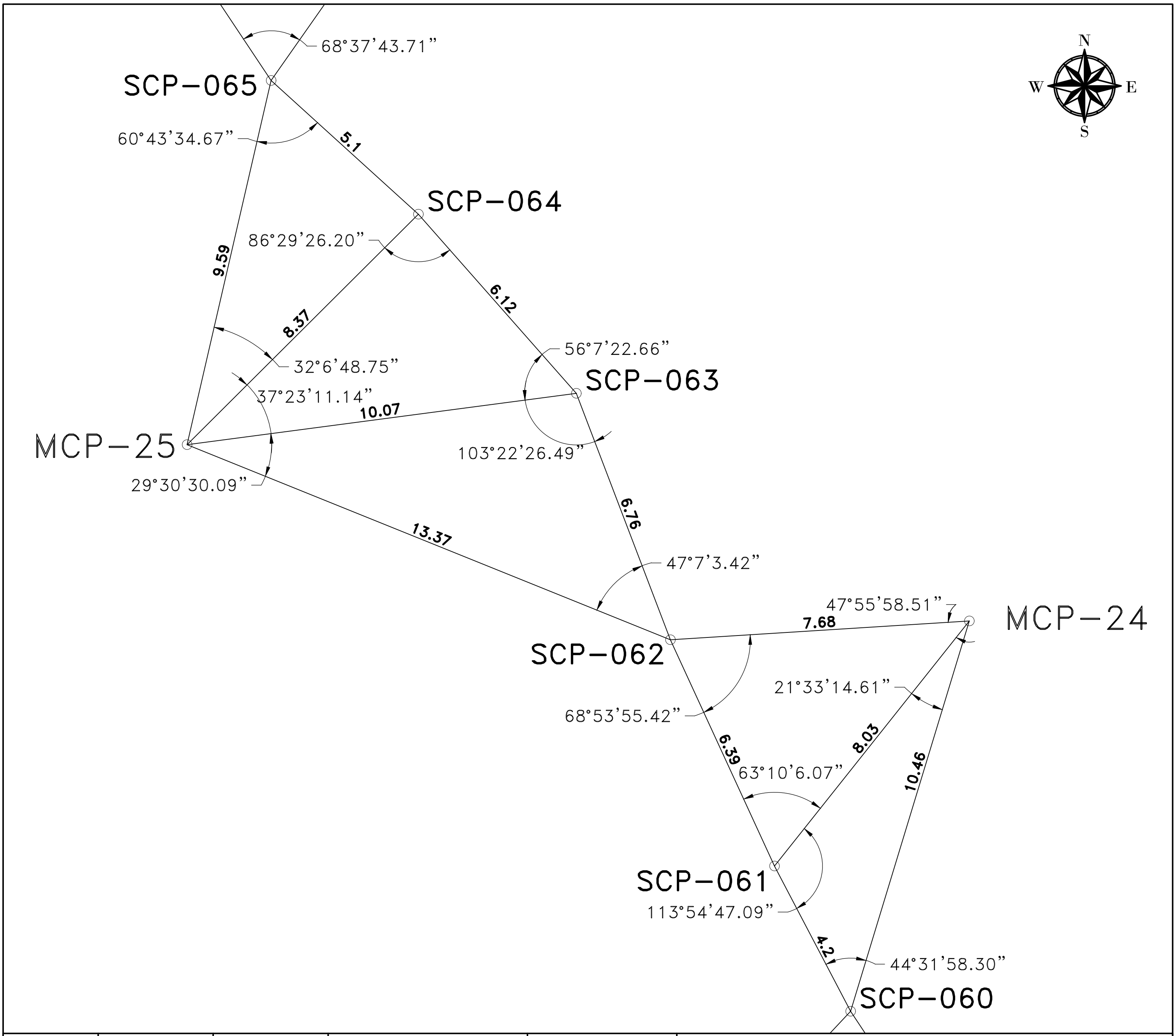
ID	X	Y	Line	Bearing	Description
SCP-046	651046.747	1125569.290	SCP-046_SCP-047	313° 0' 56.22"	The survey station, KRDCL-046-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Salem-Kochi road. The survey station is near by fire and rescue station. It is approximately 2 metres away from the ofc stone.
SCP-047	646681.356	1129642.308	SCP-047_SCP-048	310° 53' 29.78"	The survey station, KRDCL-047-SCP is marked with red and white paint and nail point on the top of the Karakutty-Elavoor BT road. The survey station is near by saint marys catholic church,kuviyakkulam village. It is approximately 8 metres away from the telephone pole.
SCP-048	642872.509	1132940.658	SCP-048_SCP-049	339° 51' 6.74"	The survey station, KRDCL-048-SCP/TCP is marked with white circular paint and nail point on the top of the Alathur-vannoor BT road. The survey station is near by saint mary's church,vannoor village. It is approximately 5 metres away from the church program hall.
SCP-049	641522.156	1136621.089	SCP-049_SCP-050	349° 11' 58.09"	The survey station, KRDCL-049-SCP is marked with red and white paint and nail point on the top of the Astamichira-Challkudy BT road. The survey station is near by saint joseph school. It is approximately 5 metres away from the electric pole.
SCP-050	640941.917	1139662.655	SCP-050_SCP-051	321° 3' 46.50"	The survey station, KRDCL-050-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Chalakudy-Komodinamakkal road. The survey station is near by residential building,chalakudy village. It is approximately 2 metres away from the canal.



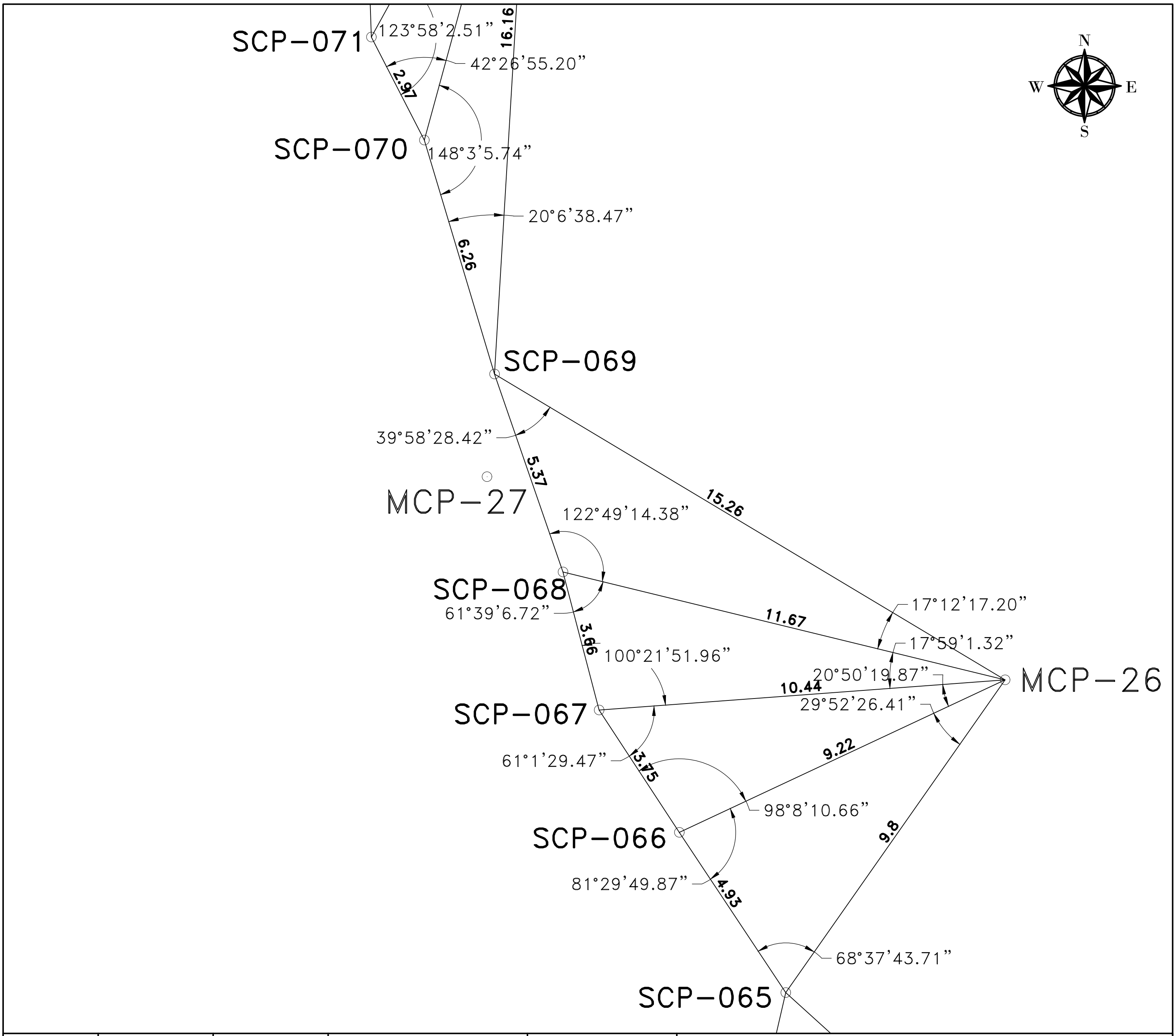
ID	X	Y	Line	Bearing	Description
SCP-051	637802.977	1143547.638	SCP-051_SCP-052	333° 12' 36.57"	The survey station, KRDCL-051-SCP is marked with red and white paint and nail point on the top of the concrete slab on the side of the Moonupedika-Potta BT road. The survey station is near by thommana lake. It is approximately 2 metres away from the sunrise saw mill shop.
SCP-052	635365.711	1148374.731	SCP-052_SCP-053	319° 7' 41.06"	The survey station, KRDCL-052-SCP is marked with red and white paint and nail point on the top of the bridge of the Mapparnam-Nandhikara BT road. The bridge is across the muriyad-moor canal. It is approximately 50 metres away from the electric pole.
SCP-053	631218.460	1153167.191	SCP-053_SCP-054	13° 9' 15.11"	The survey station, KRDCL-053-SCP/TCP is marked with white circular paint and nail point on the top of the Cherpu- Thriprayar BT road. The survey station is near by co-operative bank,cherpu village. It is approximately 30 metres away from the padinattamuri bus stop.
SCP-054	632256.692	1157609.687	SCP-054_SCP-055	359° 9' 15.53"	The survey station, KRDCL-054-SCP is marked with red and white paint and nail point on the top of the Pallakal-Ammadan BT road. The survey station is near by residential building,venginissery village. It is approximately 30 metres away from the rajesh complex.
SCP-055	632167.112	1163678.344	SCP-055_SCP-056	342° 10' 57.35"	The survey station, KRDCL-055-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Dilkush road. The survey station is near by railway overbridge . It is approximately 15 metres away from the vijayasree eye hospital.



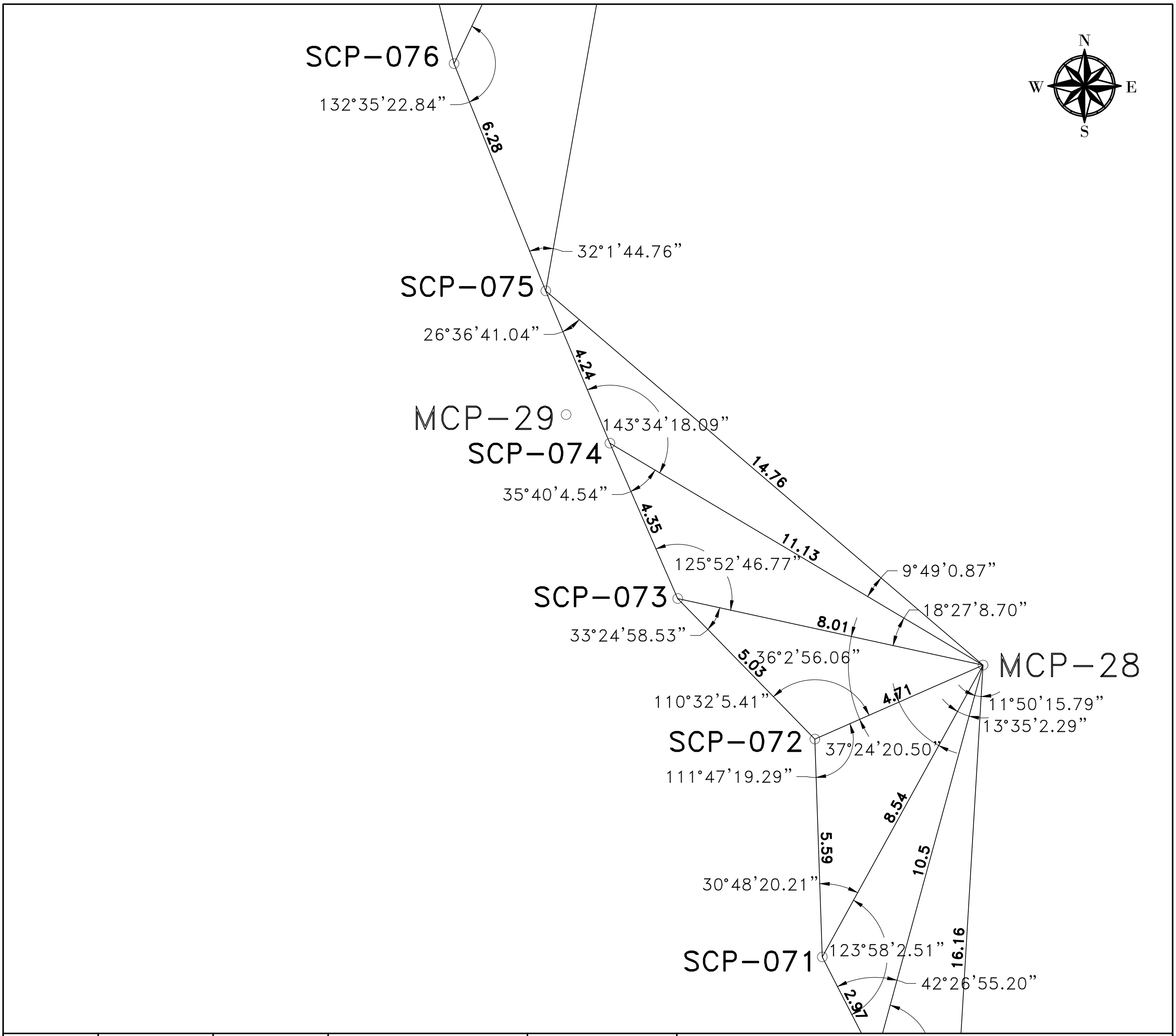
ID	X	Y	Line	Bearing	Description
SCP-056	630480.507	1168926.027	SCP-056_SCP-057	305° 26' 43.05"	The survey station, KRDCL-056-SCP is marked with red and white paint and nail point on the top of the Mundur-Kottakad BT road. The survey station is near by K.A.lisson kolengadam house,kottekkad village. It is approximately 5 metres away from the telephone box.
SCP-057	628305.451	1170474.348	SCP-057_SCP-058	307° 55' 37.40"	The survey station, KRDCL-057-SCP is marked with red and white paint and nail point on the top of the Mundur-Kottakad BT road. The survey station is near by edhan's bakery,mudur-kottekkad road. It is approximately 2 metres away from the well.
SCP-058	623202.789	1174450.533	SCP-058_SCP-059	311° 41' 5.23"	The survey station, KRDCL-058-SCP/TCP is marked with white circular paint and nail point on the top of the wadakkancherry-kurancherry-velor BT road. The survey station is near by vazhanai canal. It is approximately 40 metres away from the najith stores.
SCP-059	618731.455	1178432.217	SCP-059_SCP-060	326° 25' 30.64"	The survey station, KRDCL-059-SCP is marked with red and white paint and nail point on the top of the Kunnamkulam-Wadakkancherry BT road. The survey station is near by bhaskara nivas house,chowannur. It is approximately 5 metres away from the electric pole.
SCP-060	615795.538	1182855.343	SCP-060_SCP-061	332° 22' 49.88"	The survey station, KRDCL-060-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Pazhanji-Kadavallor road. The survey station is near by cheenikkal ayyappa temple,aynoor village. It is approximately 8 metres away from the electric pole.



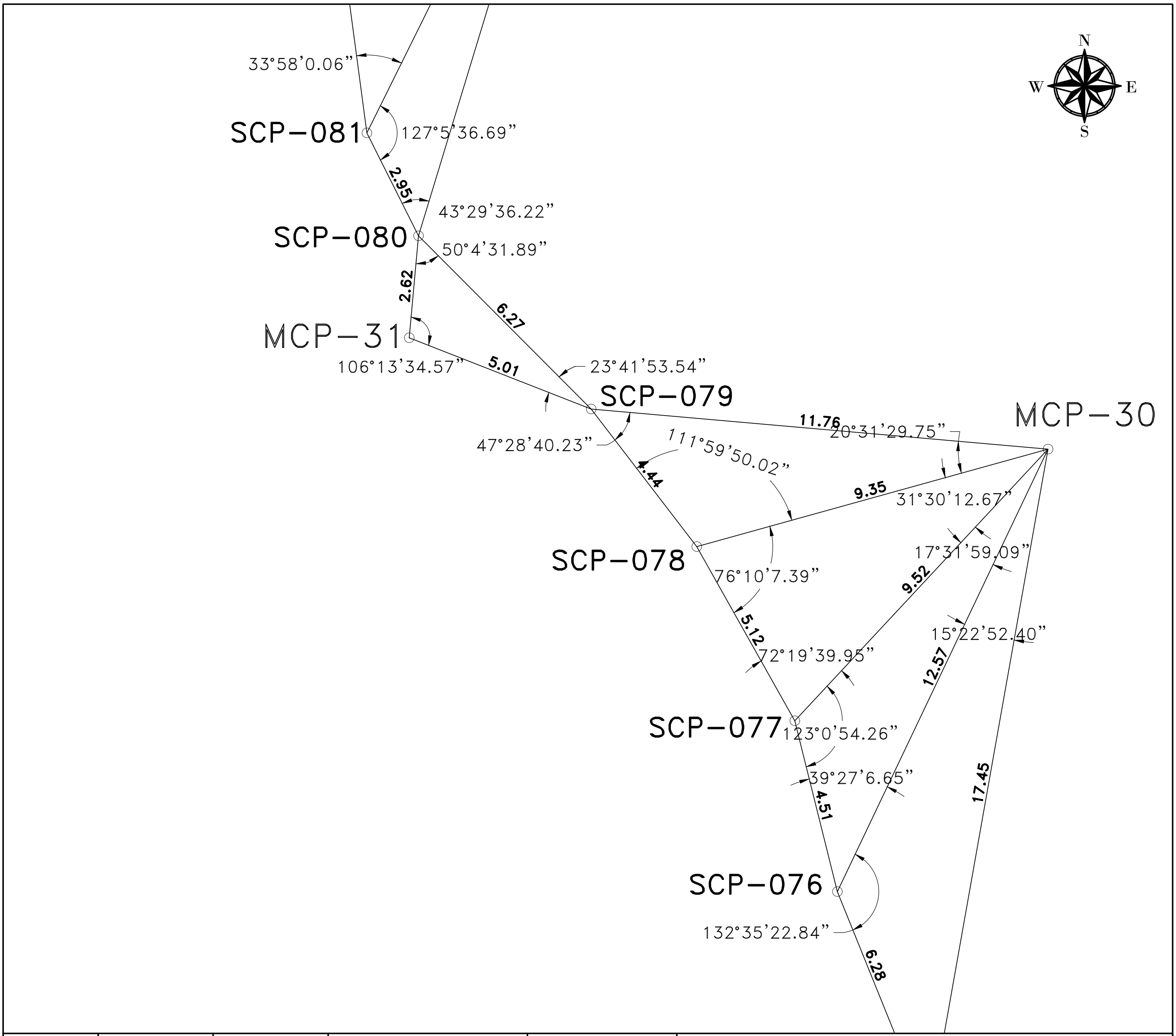
ID	X	Y	Line	Bearing	Description
SCP-061	613845.193	1186582.922	SCP-061_SCP-062	335° 17' 56.71"	The survey station, KRDCL-061-SCP is marked with red and white paint and nail point on the top of the culvert on the side of the Kunnamkulam-Thrissur BT road. The survey station is near by emirates petroleum. It is approximately 10 metres away from the bus stop.
SCP-062	611174.749	1192388.640	SCP-062_SCP-063	339° 6' 45.58"	The survey station, KRDCL-062-SCP/TCP is marked with white circular paint and nail point on the top of the Palakkad-Ponnai BT road. The survey station is near by seena biryani center. It is approximately 5 metres away from the women city ladies club.
SCP-063	608761.069	1198713.637	SCP-063_SCP-064	318° 36' 34.74"	The survey station, KRDCL-063-SCP is marked with red and white paint and nail point on the top of the culvert on the Panavel-Kochi-Kanniyakumari BT road. The survey station is near by panvel kochi kanyakumari highway name board. It is approximately 10 metres away from the tea shop.
SCP-064	604710.188	1203310.020	SCP-064_SCP-065	312° 15' 37.52"	The survey station, KRDCL-064-SCP is marked with red and white paint and nail point on the top of the Koloopalam-Mukkulapedika BT road. The survey station is near by railway track. It is approximately 10 metres away from the fish shop.
SCP-065	600931.737	1206743.378	SCP-065_SCP-066	326° 24' 9.46"	The survey station, KRDCL-065-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Tirur-Malapuram road.. The survey station is near by new light electrical and CV metals. It is approximately 15 metres away from the railway track.



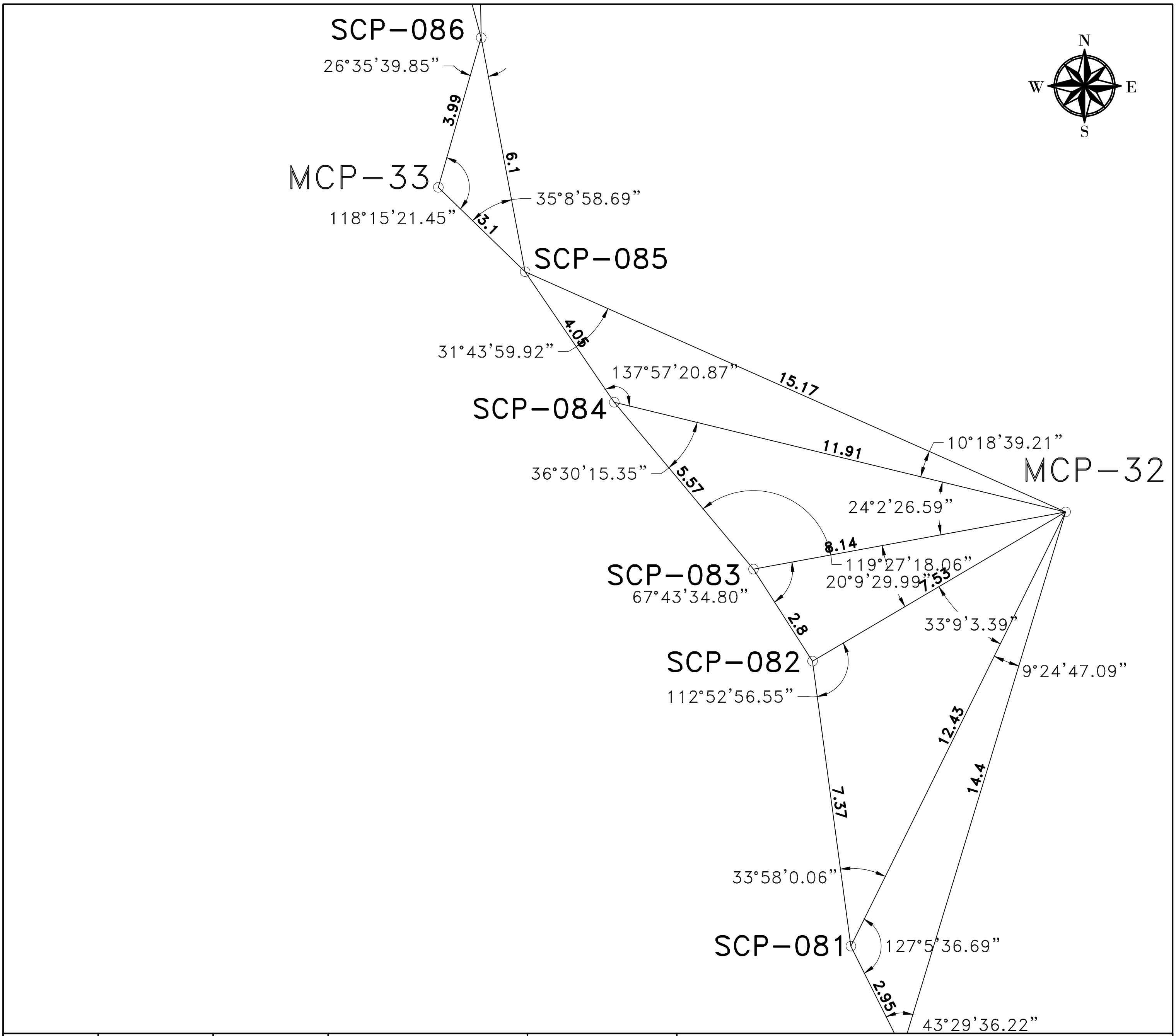
ID	X	Y	Line	Bearing	Description
SCP-066	598200.554	1210854.548	SCP-066_SCP-067	326° 46' 8.94"	The survey station, KRDCL-066-SCP is marked with red and white paint and nail point on the top of the railway footpath and is on the side of the Tharur-Thirur BT road. The survey station is near by vattathani bus stop. It is approximately 42 metres away from the shadi bakery.
SCP-067	596144.193	1213993.307	SCP-067_SCP-068	345° 22' 47.50"	The survey station, KRDCL-067-SCP is marked with red and white paint and nail point on the top of culvert on the side of the Tanur-Velliyur BT road. The survey station is near by railway track. It is approximately 120 metres away from the agricultural land.
SCP-068	595219.566	1217537.897	SCP-068_SCP-069	340° 54' 26.40"	The survey station, KRDCL-068-SCP/TCP is marked with white circular paint and nail point on the top of the concrete slab covering a drainage on the side of the Thirur-Kadalundi BT road. The survey station is near by konangotu sree bhadrakali temple. It is approximately 5 metres away from the garments shop.
SCP-069	593461.912	1222615.801	SCP-069_SCP-070	343° 19' 6.08"	The survey station, KRDCL-069-SCP is marked with red and white paint and nail point on the top of the Chamaravattan-Thirur-Kozhikode BT road. The survey station is near by KM complex. It is approximately 50 metres away from the ayyappankavu bus stop.
SCP-070	591663.030	1228618.773	SCP-070_SCP-071	332° 49' 5.14"	The survey station, KRDCL-070-SCP is marked with red and white paint and nail point on the top of the Annangadi-Athanikal BT road. The survey station is near by railway track. It is approximately 45 metres away from the fcacar accpssories shop and midsom hotel.



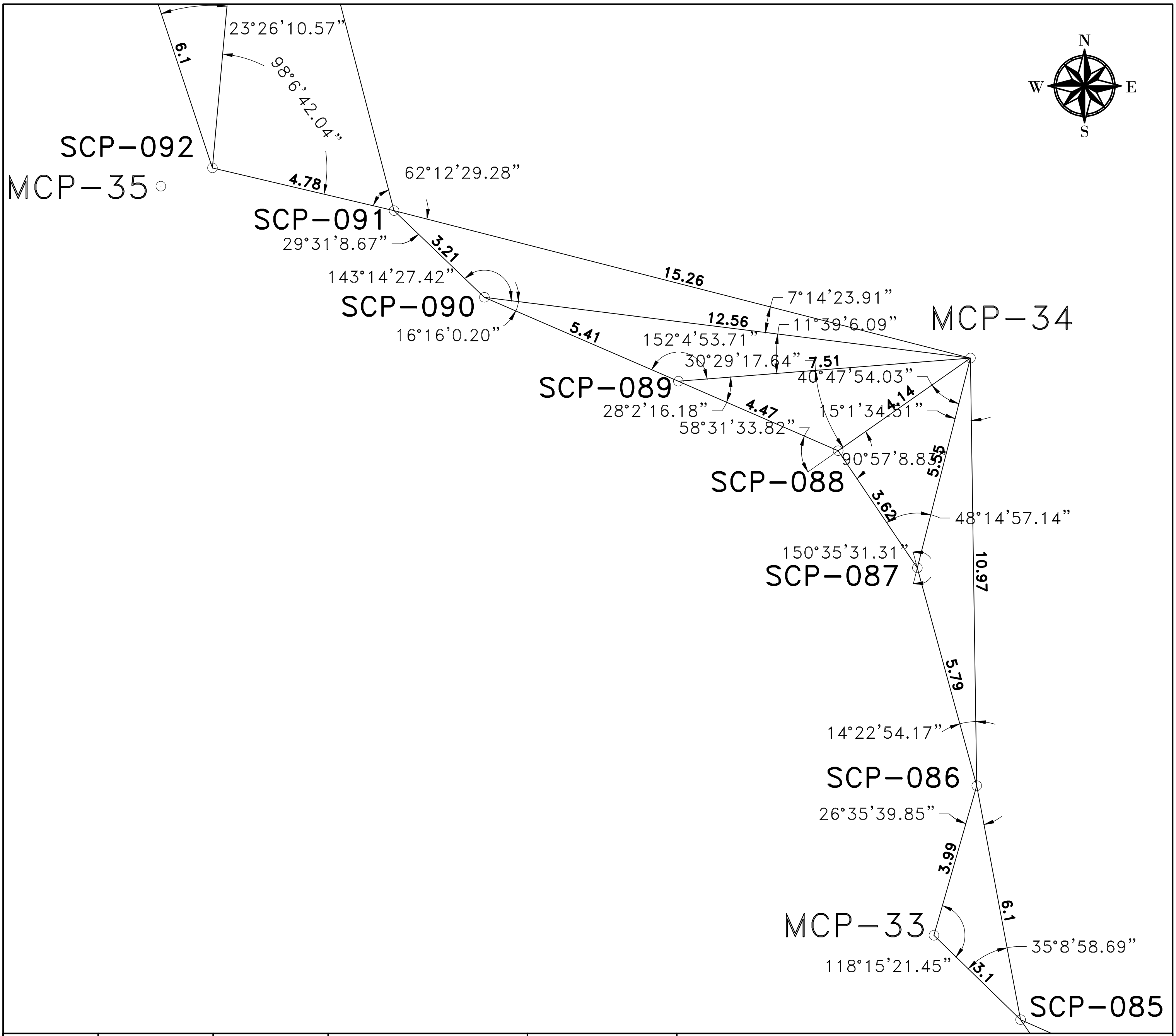
ID	X	Y	Line	Bearing	Description
SCP-071	590304.193	1231264.839	SCP-071_SCP-072	358° 2' 42.42"	The survey station, KRDCL-071-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Kadalundy road.. The survey station is near by railway crossing. It is approximately 15 metres away from the tea shop.
SCP-072	590113.439	1236853.492	SCP-072_SCP-073	315° 43' 17.72"	The survey station, KRDCL-072-SCP is marked with red and white paint and nail point on the top of the bridge of the Beypore-Cheruvannur BT road . The bridge goes over a railway track. It is approximately 50 metres away from the monotone hyper market.
SCP-073	586596.465	1240460.187	SCP-073_SCP-074	336° 25' 32.43"	The survey station, KRDCL-073-SCP is marked with red and white paint and nail point on the top of a concrete slab covering over a drainage and is on the side of the Callicut BT road. The survey station is near by railway track. It is approximately 5 metres away from the ARE BEE chemicals.
SCP-074	584856.099	1244448.598	SCP-074_SCP-075	337° 11' 9.80"	The survey station, KRDCL-074-SCP/TCP is marked with white circular paint and nail point on the top of the CH flyover, an over the railway bridge of the Red cross road. The survey station is near by TM steels and cement shop. It is approximately 2 metres away from the electric pole.
SCP-075	583212.037	1248357.004	SCP-075_SCP-076	338° 1' 58.38"	The survey station, KRDCL-075-SCP is marked with red and white paint and nail point on the top of a concrete slab covering over a drainage and is on the side of the Bhatt road. The survey station is near by sitara gents hostel. It is approximately 20 metres away from the electric pole.



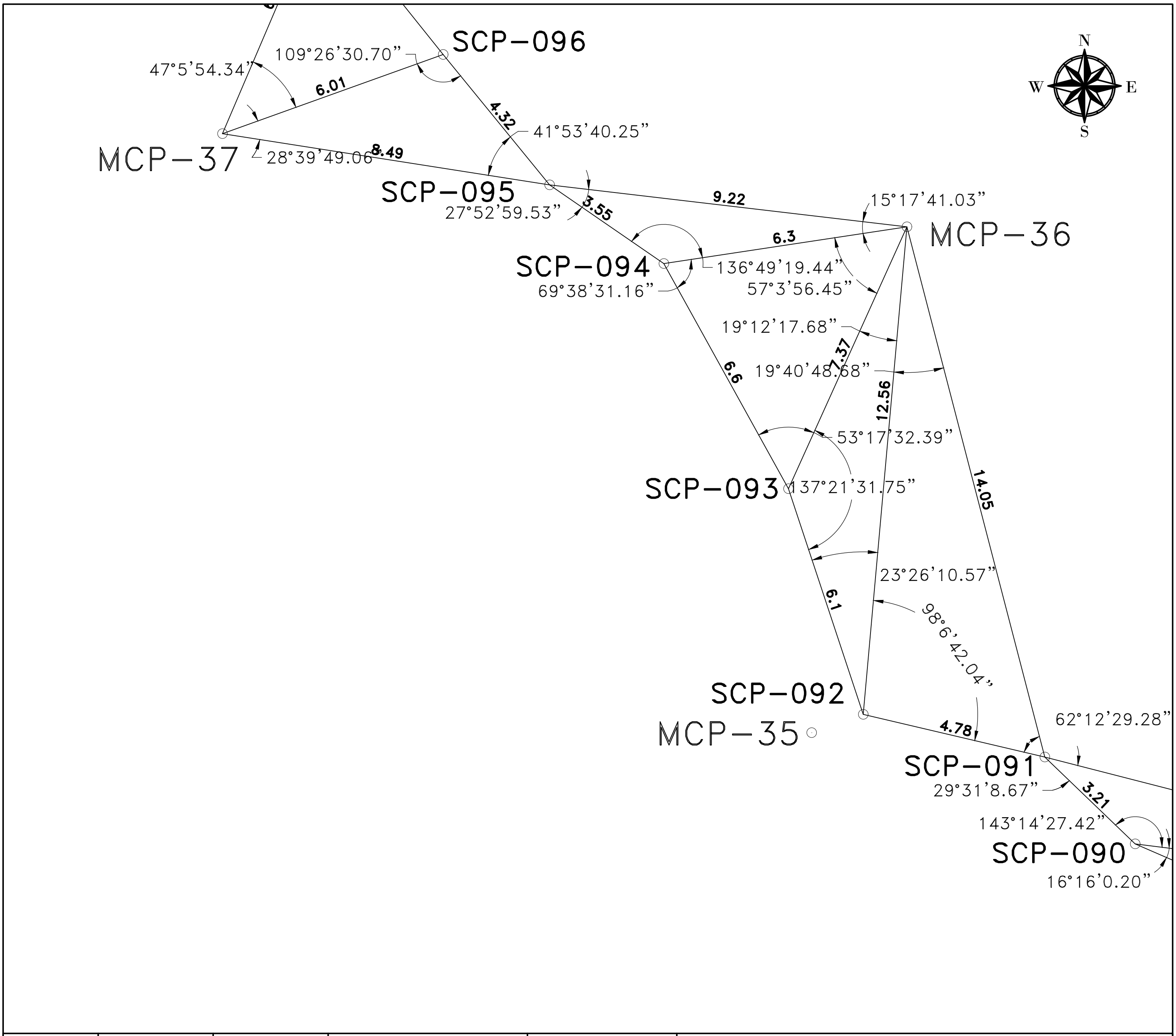
ID	X	Y	Line	Bearing	Description
SCP-076	580859.307	1254189.851	SCP-076_SCP-077	345° 59' 28.89"	The survey station, KRDCL-076-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of local village road parallel to the railway track near the Elatthur railway station.. The survey station is near by railway crossing. It is approximately 1 metres away from the electric pole.
SCP-077	579765.617	1258573.585	SCP-077_SCP-078	330° 38' 54.68"	The survey station, KRDCL-077-SCP is marked with red and white paint and nail point on the top of the Kappad-Thiruvangoor BT road. The survey station is near by railway crossing. It is approximately 40 metres away from the shadi mahal.
SCP-078	577251.774	1263043.785	SCP-078_SCP-079	322° 28' 57.27"	The survey station, KRDCL-078-SCP/TCP is marked with white circular paint and nail point on the top of the over the railway bridge of the Panvel-Kochi-Kanniyakumari highway near Koyilandy town. The survey station is near by retaining wall. It is approximately 5 metres away from the street lamp.
SCP-079	574542.550	1266572.292	SCP-079_SCP-080	315° 7' 40.55"	The survey station, KRDCL-079-SCP is marked with red and white paint and nail point on the top of the Concrete slab covering a drainage on the side of the Panvel-Kochi-Kanniyakumari BT road. The survey station is near by kollam railway crossing. It is approximately 5 metres away from the electric pole.
SCP-080	570115.675	1271018.980	SCP-080_SCP-081	333° 24' 24.37"	The survey station, KRDCL-080-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Purakkad-Muchukunnu Road. The survey station is near by residential building. It is approximately 3 metres away from the street lamp.



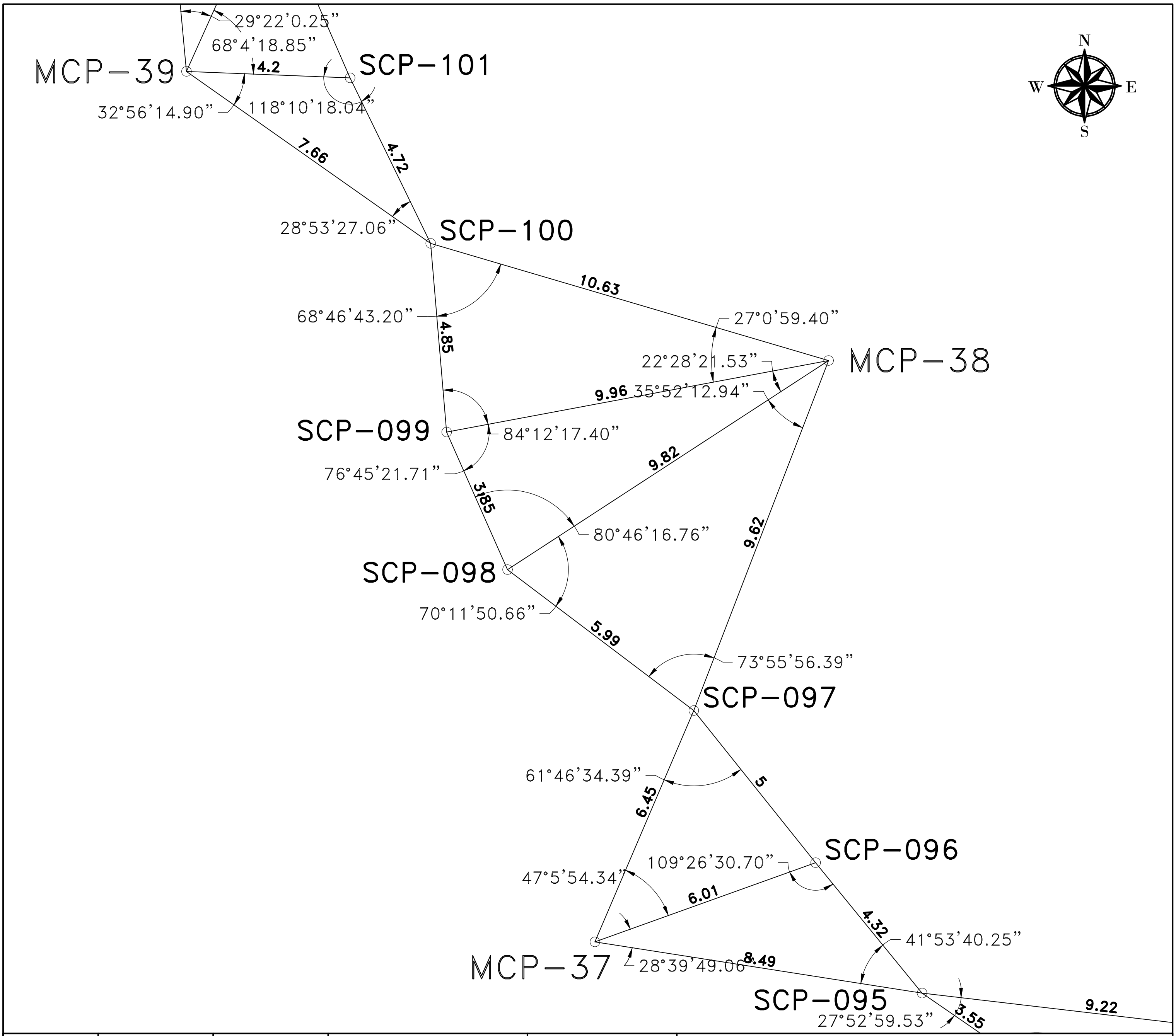
ID	X	Y	Line	Bearing	Description
SCP-081	568793.176	1273660.729	SCP-081_SCP-082	352° 20' 47.62"	The survey station, KRDCL-081-SCP is marked with red and white paint and nail point on the top of the tiled pavement on the side of the Payyoli-Cherranndathur BT road. The survey station is near by vegetable shop. It is approximately 20 metres away from the electric pole.
SCP-082	567810.381	1280974.394	SCP-082_SCP-083	327° 20' 55.86"	The survey station, KRDCL-082-SCP is marked with red and white paint and nail point on the top of concrete slab covering a drinage on the side of the Vattakara-thiruvallur-Perambara BT road. The survey station is near by unitrun canteen. It is approximately 40 metres away from the shakthi auto mobile.
SCP-083	566295.546	1283338.423	SCP-083_SCP-084	320° 10' 3.00"	The survey station, KRDCL-083-SCP/TCP is marked with white circular paint and nail point on the top of the Nadakuthazha-Alangulakara BT road. The survey station is near by cultivation land. It is approximately 10 metres away from the EHT pole.
SCP-084	562724.058	1287620.115	SCP-084_SCP-085	325° 42' 26.78"	The survey station, KRDCL-084-SCP is marked with red and white paint and nail point on the top of the Madappally Railway BT road. The survey station is near by PM complex. It is approximately 15 metres away from the electric pole.
SCP-085	560439.073	1290970.712	SCP-085_SCP-086	349° 22' 44.04"	The survey station, KRDCL-085-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Orkatheri-Kunjipally Road. The survey station is near by signboard. It is approximately 10 metres away from the electric pole.



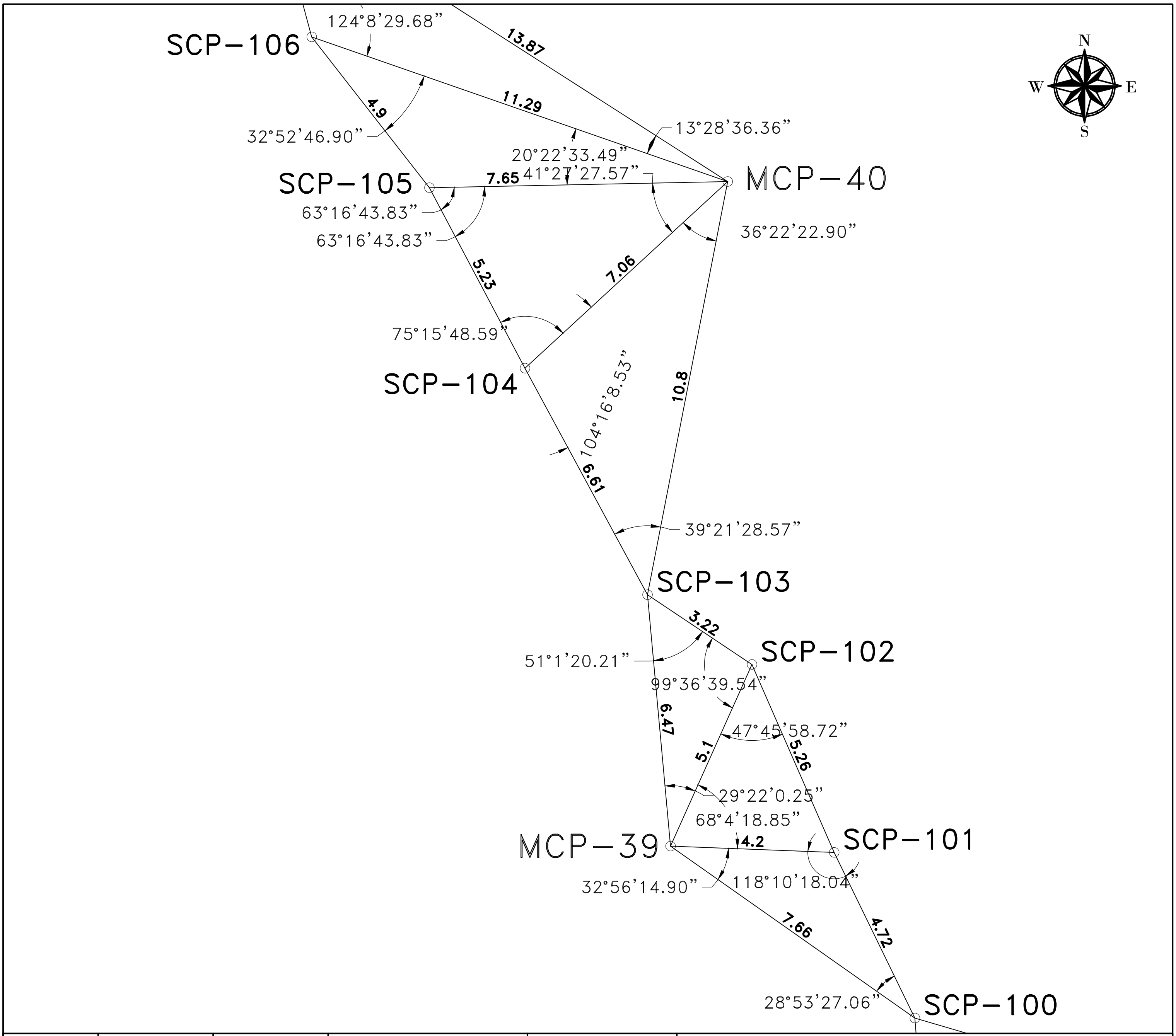
ID	X	Y	Line	Bearing	Description
SCP-086	559313.317	1296973.908	SCP-086_SCP-087	344° 46' 33.78"	The survey station, KRDCL-086-SCP is marked with red and white paint and nail point on the top of the concrete slab covering a drainage on the side of the Thalaserry-Nadapuram BT road. The survey station is near by bar and restorent. It is approximately 3 metres away from the electric pole.
SCP-087	557791.445	1302566.088	SCP-087_SCP-088	325° 56' 5.33"	The survey station, KRDCL-087-SCP is marked with red and white paint and nail point on the top of the concrete slab covering a drainage on top of the Thalaserry-Coorg highway BT road. The survey station is near by kadipur service bunk. It is approximately 15 metres away from the electric pole.
SCP-088	555759.055	1305571.848	SCP-088_SCP-089	293° 30' 30.32"	The survey station, KRDCL-088-SCP/TCP is marked with white circular paint and nail point on the top of the Panthakkapara-Kappumal BT road. The survey station is near by residential building,pinarayi vilaage. It is approximately 15 metres away from the chalil sree muthappan madawpam temple.
SCP-089	551658.509	1307355.533	SCP-089_SCP-090	293° 23' 20.44"	The survey station, KRDCL-089-SCP is marked with red and white paint and nail point on the top of theCheruvillayi BT road. The survey station is near by vimalalayam house. It is approximately 15 metres away from the transformer.
SCP-090	546684.059	1309507.037	SCP-090_SCP-091	313° 52' 52.82"	The survey station, KRDCL-090-SCP is marked with red and white paint and nail point on the top of the Panvel-Kochi-Kanniyakumari BT road. The survey station is near by railway track. It is approximately 20 metres away from the electric pole.



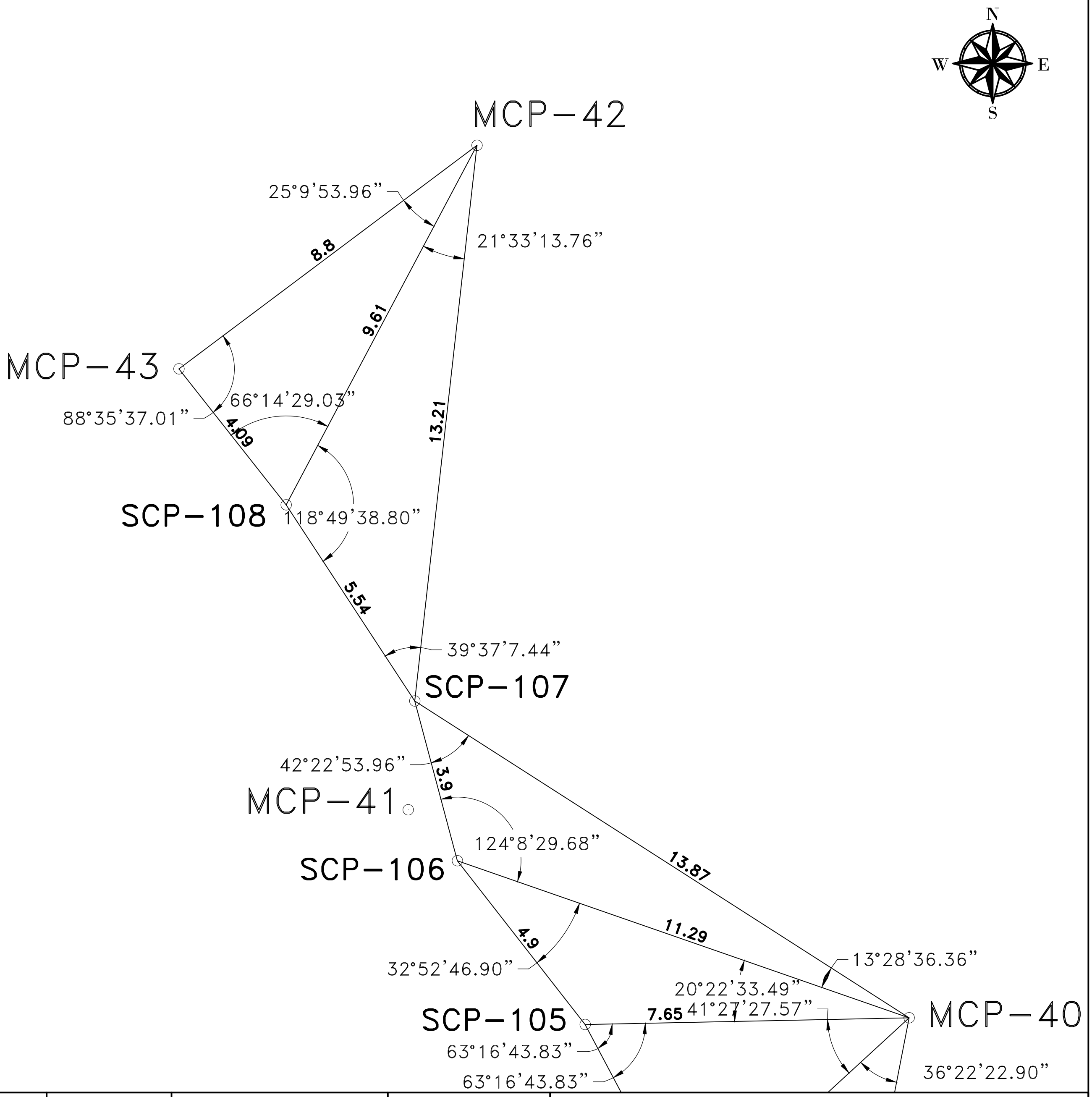
ID	X	Y	Line	Bearing	Description
SCP-091	544367.611	1311734.752	SCP-091_SCP-092	283° 13' 52.91"	The survey station, KRDCL-091-SCP is marked with red and white paint and nail point on the top of the concrete slab covering a drainage on the side of the NH-17 BT road. The survey station is near by bake'n'joy shop,kannur road. It is approximately 10 metres away from the bus stop.
SCP-092	539711.744	1312829.465	SCP-092_SCP-093	341° 41' 0.30"	The survey station, KRDCL-092-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. . The survey station is near by on the side of the mud road infront of sreedaran company private limited. It is approximately 5 metres away from the railway track.
SCP-093	537794.401	1318621.351	SCP-093_SCP-094	331° 1' 56.16"	The survey station, KRDCL-093-SCP is marked with red and white paint and nail point on the top of the concrete slab covering a drainage on the side of the Vazhapattinam-Azhikkal BT road. The survey station is near by civil supply godown,valapattanam. It is approximately 10 metres away from the grama panchayat office.
SCP-094	534596.121	1324398.872	SCP-094_SCP-095	304° 34' 5.57"	The survey station, KRDCL-094-SCP is marked with red and white paint and nail point on the top of the concrete slab covering the drainage on the side of the Morazha-Kannapuram BT road. The survey station is near by kannapuram-dharmasala road. It is approximately 20 metres away from the kannapuram railway crossing.
SCP-095	531666.383	1326417.565	SCP-095_SCP-096	320° 47' 32.81"	The survey station, KRDCL-095-SCP/TCP is marked with white circular paint and nail point on the top of the Pilathara-Pappinisseri BT road. The survey station is near by vellarangal post office. It is approximately 15 metres away from the railway track.



ID	X	Y	Line	Bearing	Description
SCP-096	528935.378	1329765.207	SCP-096_SCP-097	321° 21' 34.78"	The survey station, KRDCL-096-SCP is marked with red and white paint and nail point on the top of the concrete slab covering the drainage on the side of the Payangadi-Payyannur BT road. The survey station is near by eripuram junction. It is approximately 8 metres away from the my home show room.
SCP-097	525813.085	1333670.793	SCP-097_SCP-098	307° 6' 42.83"	The survey station, KRDCL-097-SCP is marked with red and white paint and nail point on the top of the village BT road. The survey station is near by zahid store,kowapuram. It is approximately 5 metres away from the railway track.
SCP-098	521033.705	1337286.970	SCP-098_SCP-099	336° 8' 35.40"	The survey station, KRDCL-098-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Ezhimala-Payyanoor road. The survey station is near by kotty railway station. It is approximately 15 metres away from the axis bank.
SCP-099	519472.682	1340816.796	SCP-099_SCP-100	355° 10' 56.29"	The survey station, KRDCL-099-SCP is marked with red and white paint and nail point on the top of the concrete slab covering a drainage on top of the Payyannur-Kallikkad BT road. The survey station is near by karolam masjid. It is approximately 15 metres away from the glow car washing and polish interior.
SCP-100	519064.797	1345656.243	SCP-100_SCP-101	334° 3' 3.30"	The survey station, KRDCL-100-SCP is marked with red and white paint and nail point on the top of the Chandhreaya-Thrikaripur-Olavara BT road. The survey station is near by government homeopathy hospital,theru natakkvu village. It is approximately 8 metres away from the electric pole.



ID	X	Y	Line	Bearing	Description
SCP-101	516996.437	1349906.592	SCP-101_SCP-102	336° 23' 3.77"	The survey station, KRDCL-101-SCP/TCP is marked with white circular paint and nail point on the top of the service BT road under the Cheruvathur-Panvel over the railway bridge. The survey station is near by over bridge,cheruvathur-achanthurath. It is approximately 10 metres away from the railway track.
SCP-102	514888.309	1354728.323	SCP-102_SCP-103	303° 45' 42.04"	The survey station, KRDCL-102-SCP is marked with red and white paint and nail point on the top of the Service BT road. The survey station is near by neeleshwaram railway station. It is approximately 50 metres away from the railway station bus stop.
SCP-103	512210.656	1356518.263	SCP-103_SCP-104	331° 36' 46.59"	The survey station, KRDCL-103-SCP is marked with red and white paint and nail point on the top of the footpath,Pandankkad flyoverof Panavel-Kanniyakumari Highway BT road. The survey station is near by panvel-kanyakumari highway,pandankkad village. It is approximately 10 metres away from the speed limit signage.
SCP-104	509067.700	1362334.178	SCP-104_SCP-105	332° 4' 49.46"	The survey station, KRDCL-104-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of BT road that leads to the Kanhagad railway station. The survey station is near by kanhangad railway station. It is approximately 15 metres away from the railway gate office building.
SCP-105	506614.211	1366964.183	SCP-105_SCP-106	322° 3' 26.03"	The survey station, KRDCL-105-SCP is marked with red and white paint and nail point on the top of the Kasargod-Kannur BT road. The survey station is near by azeeziya arabic college. It is approximately 1 metres away from the traffic signal.



ID	X	Y	Line	Bearing	Description
SCP-106	503595.769	1370835.577	SCP-106_SCP-107	345° 2' 9.44"	The survey station, KRDCL-106-SCP/TCP is marked with white circular paint and nail point on the top of the over the railway bridge of Bekal--Periyathadukkam Road, near Bekal Town. The survey station is near by illyas juma masjid,kheleniya village. It is approximately 30 metres away from the adhi katrumula malingamasthery temple.
SCP-107	502587.160	1374609.228	SCP-107_SCP-108	326° 46' 26.23"	The survey station, KRDCL-107-SCP is marked with red and white paint and nail point on the top of the Edappally-Panavel BT road. The survey station is near by puthiyaram bus stop. It is approximately 8 metres away from the railway track.
SCP-108	499550.910	1379244.504			The survey station, KRDCL-108-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Kasargod beach road. The survey station is near by kasargod road. It is approximately 8 metres away from the railway track.

DAILY FLIGHT LOG SHEETS

GEO KNO

KERALA RAIL DEVELOPMENT CORPORATION LIMITED

Aerial LiDAR Survey for Thiruvananthapuram-Kasaragod Semi-High-Speed Rail Corridor

Date	31.12.2019	Mission	FLT-01
Starting Base	Kannur	Landing Base	Kannur
Engine On	09:26AM	Engine Off	01:57PM
Pilot	Capt. Tarali	Co-Pilot	Capt. Ashwani
AME	Dharmendra singh	Lidar Engineer	Sathish Sekaran
Security Officer	S. Prasanth	Duration	271min (4hour 31min)
Area Covered	–	Lengt Surveyed	177.808 km

Storage Details

INS Session	Session – 0	Laser HDD	71-0136
Photo HDD	S4ANFOM5024ITD	Base Station	KRDCL-104-SCP & KRDCL-92-SCP

Flying Parameters

Altitude Above Ground	1000 feet	Aircraft Ground Speed	110 kn
PRR	400 KHZ	LiDAR & Camera FOV	60° & 53°

FL Number	Laser File Name		Remarks
	Session-0		
Test	040728		
+46	041011		
–36	041618		
–28	041934		
–26	042336		
–21	042650		
–19	043016		
–13	043252		
–3	043548		
+1	043941		
–9	044137		
–17	044437		
+29	045152		
+37	045152		

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KERALA RAIL DEVELOPMENT CORPORATION LIMITED

FL Number	Laser File Name			Remarks
+40	050045			
-45	050655			
+44	051113			
-42	051624			
-32	052114			
-16	052829			
+8	053502			
-5	053805			
+2	054126			

Operator

Security Officer

SE|KRDCL
31|12|2019

GEO KNO

KERALA RAIL DEVELOPMENT CORPORATION LIMITED

Aerial LiDAR Survey for Thiruvananthapuram-Kasaragod Semi-High-Speed Rail Corridor

Date	31.12.2019	Mission	FLT-02
Starting Base	Kannur	Landing Base	Kannur
Engine On	09:26AM	Engine Off	01:57PM
Pilot	Capt. Taxali	Co-Pilot	Capt. Ashwani
AME	Dharmendra Singh	Lidar Engineer	Sathish Sekaran
Security Officer	S. Prasanth	Duration	271min(4hours 31min)
Area Covered	–	Lengt Surveyed	222.596km
Storage Details			
INS Session	Session - 1 ✓	Laser HDD	71-0136
Photo HDD	S41ANF0MS02417D	✓ Base Station	KRDCL-104-SCP & KRDCL-92-SCP
Flying Parameters			
Altitude Above Ground	1000 feet	Aircraft Ground Speed	110kn
PRR	400KHZ	LiDAR & Camera FOV	60° & 53°

FL Number	Laser File Name			Remarks
	Session-1			
Test	054727			
+7	054828			
-2	055228			
+4	055537			
+418	055954			
-6	060720			
+10	061138			
-11	061447			
+12	061716			
+15	062043			
+18	062353			
-419	062858			
+14	063426			
+20	063729			

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FL Number	Laser File Name			Remarks
-22	064151			
+23	064358			
+30	064631			
-31	065313			
-27	065313			
+25	070120			
-24	070414			
+33	070831			
-34	071245			
-35	071725			
+41	072006			
-39	072351			
+38	072859			
-43	073749			
+50	074612			
-47	075147			
+49	075546			
-48	080057			
+125	080515			
+51	080837			
+56	081303			
-55	081729			

Operator

Security Officer

SE/KRDC
31/12/2019

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KERALA RAIL DEVELOPMENT CORPORATION LIMITED

KRDCL

Aerial LiDAR Survey for Thiruvananthapuram-Kasaragod Semi-High-Speed Rail Corridor

Date	01. 01. 2020	Mission	FLT-03
Starting Base	Kannur	Landing Base	Kannur
Engine On	10:49 AM	Engine Off	02:43 PM
Pilot	Capt. Tarali	Co-Pilot	Capt. Ashwani
AME	Dharmendra singh	Lidar Engineer	Sathish Sekaran
Security Officer	Dhanesh Aravind	Duration	234 min (3 hours 54 min)
Area Covered	—	Lengt Surveyed	229.838 km

Storage Details

INS Session	Session - 0	Laser HDD	71-0136
Photo HDD	S42ANFOH50241TD	Base Station	KRDCL-092-SCP, KRDCL-081-SCP, KRDCL-076-SCP

Flying Parameters

Altitude Above Ground	1000 feet	Aircraft Ground Speed	110 kn
PRR	400 KHZ	LiDAR & Camera FOV	60° & 53°

FL Number	Laser File Name			Remarks
	Session-0			
Test	052813			
-53	052858			
+58	053231			
+66	053547			
+72	053838			
+79	053838			
-84	054459			
+94	054813			
-96	055342			
-97	055515			
-100	060026			
+102	060231			
-101	060427			
+99	060758			

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FL Number	Laser File Name			Remarks
-91	061407			
+88	061407			
-78	061937			
-69	062440			
+62	062759			
-57	062759			
+60	063248			
+67	063604			
+73	063857			
+80	063857			
-85	064540			
+93	064848			
-98	064848			
-95	064846			
-89	070423			
-83	070924			
+81	071253			
-82	071613			
-77	071613			
-70	072254			
+63	072652			
+61	073007			
-65	073232			
+68	073616			
+75	073901			
-86	074533			
+92	074852			

Operator

01-01-2020
Security Officer
SE/KRDCL

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GEO KNO

KERALA RAIL DEVELOPMENT CORPORATION LIMITED

Aerial LiDAR Survey for Thiruvananthapuram-Kasaragod Semi-High-Speed Rail Corridor

Date	01.01.2020	Mission	FLT-04
Starting Base	Kannur	Landing Base	Kannur
Engine On	10:49 AM	Engine Off	02:43 PM
Pilot	Capt. Taxali	Co-Pilot	Capt. Ashwani
AME	Dharmendra singh	Lidar Engineer	Sathish Sekaran
Security Officer	Dhanesh Aravind	Duration	234 min (3 hours 54 min)
Area Covered	–	Lengt Surveyed	49.426 km

Storage Details

INS Session	Session-1	Laser HDD	71-0136
Photo HDD	S41ANF0M502417D	Base Station	KRDCL-092-SCP, KRDCL-081-SCP, KRDCL-070-SCP

Flying Parameters

Altitude Above Ground	1000 feet	Aircraft Ground Speed	110 kn
PRR	400 KHZ	LiDAR & Camera FOV	60° & 53°

FL Number	Laser File Name	Remarks
	Session-1	
Test	075521	
-103	075711	
+113	080420	
+122	080816	
+126	081202	
-127	081658 (081658)	

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KERALA RAIL DEVELOPMENT CORPORATION LIMITED

KRDCL

FL Number	Laser File Name			Remarks

Operator

01/01/2020
Security Officer
SE/KRDCL

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KERALA RAIL DEVELOPMENT CORPORATION LIMITED

KRDCL

Aerial LiDAR Survey for Thiruvananthapuram-Kasaragod Semi-High-Speed Rail Corridor

Date	01.01.2020	Mission	FLT-05
Starting Base	kannur	Landing Base	kannur
Engine On	10:49 AM	Engine Off	02:43 PM
Pilot	Capt. Tarali	Co-Pilot	Capt. Ashwani
AME	Dharmendra Singh	Lidar Engineer	Sathish Sekeran
Security Officer	Dharesh Aravind	Duration	234 min(3hours 54 min)
Area Covered	–	Lengt Surveyed	34.435 km

Storage Details

INS Session	Session - 4	Laser HDD	T1-0136
Photo HDD	S4LANFOM502417D	Base Station	KRDCL-092-SCP, KRDCL-081-SCP, KRDCL-070-SCP

Flying Parameters

Altitude Above Ground	1000 feet	Aircraft Ground Speed	110 kn
PRR	400 KHZ	LiDAR & Camera FOV	60° & 53°

FL Number	Laser File Name	Remarks
	Session-4	
Test	083921	
-90	084430	
+87	085057	
-74	085526	
+64	090243	
-59	090723	

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KERALA RAIL DEVELOPMENT CORPORATION LIMITED

FL Number	Laser File Name			Remarks

Operator

01-01-2020
Security Officer
SE/KRDCL

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KERALA RAIL DEVELOPMENT CORPORATION LIMITED

Aerial LiDAR Survey for Thiruvananthapuram-Kasaragod Semi-High-Speed Rail Corridor

Date	02.01.2020	Mission	FLT-06
Starting Base	Kannur	Landing Base	Kannur
Engine On	10:06 AM	Engine Off	02:48 PM
Pilot	Capt. Tarali	Co-Pilot	Capt. Ashwani
AME	Dharmendra Singh	Lidar Engineer	Sathish Sekeran
Security Officer	C. C. Joy	Duration	282 Min (4 hours 42 min)
Area Covered	—	Lengt Surveyed	8.289 km

Storage Details

INS Session	Session - 0	Laser HDD	71-0136
Photo HDD	S41ANF0M502417D	Base Station	KRDCL-092-SCP & KRDCL-070SCP KRDCL-060-SCP

Flying Parameters

Altitude Above Ground	1000 feet	Aircraft Ground Speed	110kn
PRR	400 KHZ	LiDAR & Camera FOV	60° & 53°

FL Number	Laser File Name			Remarks
	Session-0			
Test	044722			
+71	044824			
+76	044824			

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FL Number	Laser File Name			Remarks

Operator

Security Officer

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Aerial LiDAR Survey for Thiruvananthapuram-Kasaragod Semi-High-Speed Rail Corridor

Date	02.01.2020	Mission	FLT-07
Starting Base	Kannur	Landing Base	Kannur
Engine On	10:06 AM	Engine Off	02:48 PM
Pilot	Capt. Tarali	Co-Pilot	Capt. Ashwani
AME	Dharmendra Singh	Lidar Engineer	Sathish Sekaran
Security Officer	C.C. Joy	Duration	282 min (4 hour 42 min)
Area Covered	–	Lengt Surveyed	357.601 km

Storage Details

INS Session	Session -1	Laser HDD	71-0136
Photo HDD	S41ANF0H502417D	Base Station	KRDCL-092-SCP, KRDCL-070-SCP, KRDCL-060-SCP

Flying Parameters

Altitude Above Ground	1000 feet	Aircraft Ground Speed	110 kn
PRR	400 KHZ	LiDAR & Camera FOV	60° & 53°

FL Number	Laser File Name	Remarks
	Session-1	
Test	050854	
	051002	
-104	051144	
+119	051144	
-219	052539	
+130	052917	
+138	052917	
+139	052917	
+144	054207	
-221	054835	
+223	055145	
-225	055423	
+227	055651	
-228	055917	

FL Number	Laser File Name			Remarks
+226	060159	-117	075618	
-224	060443	+118	080457	
+222	060719	+123	080457	
-229	060952	-121	080934	
+230	061159	+120	081317	
-143	061410	-115	081638	
+145	062018	-110	081638	
-146	062721	-106	081638	
+147	063314	+107	082535	
-148	063645	+114	082751	
-149	063959	-116	083112	
+151	064320	-111	083112	
-150	064612	+112	083423	
-140	064946	-108	083621	
+141	065415	+109	083949	
-134	065842	+105	084432	
-135	070520	-210	085153	
+137	071228			
-136	071912			
-133	072647			
-220	073235			
-129	073235			
+132	073637			
-131	073951			
-128	074338			
-124	074338			
-217	075245			
+218	075618			

Operator

Security Officer

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GEO KNO

KERALA RAIL DEVELOPMENT CORPORATION LIMITED

Aerial LiDAR Survey for Thiruvananthapuram-Kasaragod Semi-High-Speed Rail Corridor

Date	03.01.2020	Mission	FLT-08
Starting Base	Kannur	Landing Base	Trivandrum
Engine On	10:24 AM	Engine Off	04:03 PM
Pilot	Capt. Tarali	Co-Pilot	Capt. Ashwani
AME	Dharmendra Singh	Lidar Engineer	Sathish Sekaran
Security Officer	Dhanesh Aravind	Duration	339 min (5hours 39 min)
Area Covered	—	Lengt Surveyed	242.933km

Storage Details

INS Session	Session - 0	Laser HDD	71-0136
Photo HDD	S42ANF0MS024 1TD	Base Station	KRDCL-050-SCP, KRDCL-038-SCP, KRDCL-027-SCP

Flying Parameters

Altitude Above Ground	1000 feet	Aircraft Ground Speed	110 Kn
PRR	400 KHZ	LiDAR & Camera FOV	60° & 53°

FL Number	Laser File Name	Remarks
	Session-0	
Test	054919	
+152	055113	
-154	055730	
+153	060420	
-142	061023	
+231	061612	
+156	061612	
-157	061612	
-232	061612	
-158	062338	
+155	062839	
+233	062839	
+159	063529	
-161	063930	

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FL Number	Laser File Name			Remarks
+160	064230			
+236	064642			
−234	065000			
+235	065313			
−237	065557			
+169	065801			
−171	065959			
+170	070455			
−237	065959			
+166	070811			
−168	071129			
+165	071512			
−28:38	071512			
−167	072105			
+173	072527			
−182	072527			
+181	073336			
−174	073538			
−174	073939			
+175	074342			
+180	074342			
−177	075107			
+179	075420	(075420)		
−178	075956			
+176	080210	+193	081323	
+190	080509	+240	081833	
−192	080802	−241	082022	
+191	081025	−183	082223	

Sathish
Operator

04/01/2020
Security Officer

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KERALA RAIL DEVELOPMENT CORPORATION LIMITED

Aerial LiDAR Survey for Thiruvananthapuram-Kasaragod Semi-High-Speed Rail Corridor

Date	03.01.2020	Mission	FLT-09
Starting Base	Kannur	Landing Base	Trivandrum
Engine On	10:24 AM	Engine Off	04:03 PM
Pilot	Capt. Tarali	Co-Pilot	Capt. Ashwani
AME	Dharmendra Singh	Lidar Engineer	Sathish Sekaran
Security Officer	Dhanesh Aravind	Duration	339 min (5 hours 39 min)
Area Covered	—	Lengt Surveyed	138.047 km
Storage Details			
INS Session	Session-1	Laser HDD	71-0136
Photo HDD	S41ANF0M5024ITD	Base Station	KRDCL-050-SCP, KRDCL-088-SCP, KRDCL-027-SCP
Flying Parameters			
Altitude Above Ground	1000 feet	Aircraft Ground Speed	110 kn
PRR	400 KHZ	LiDAR & Camera FOV	60° & 53°

FL Number	Laser File Name	Remarks
	Session-1	
Test	082927	
+183	083022	
-185	083540	
+184	084006	
+204	093720	
+198	093720	
-189	084432	
+187	084801	
+188	085037	
+186	085037	
+194	085644	
-196	090124	
+197	090456	
-195	090456	

GEO
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KERALA RAIL DEVELOPMENT CORPORATION LIMITED

KRDCL

FL Number	Laser File Name			Remarks
+242	091147			
+214	091257			
-212	091717			
+211	092140			
-243	092527			
+216	093006			
+215	093158			
+204	093720			
+198	093720			

Sarath
Operator

04/01/2020
Security Officer

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GEO
KNO

KERALA RAIL DEVELOPMENT CORPORATION LIMITED

Aerial LiDAR Survey for Thiruvananthapuram-Kasaragod Semi-High-Speed Rail Corridor

Date	04.01.2020	Mission	FLT-10
Starting Base	Trivandrum	Landing Base	Trivandrum
Engine On	12:16PM	Engine Off	05:50PM
Pilot	Capt. Taxali	Co-Pilot	Capt. Ashwani
AME	Dharmendra singh	Lidar Engineer	Sathish sekeran
Security Officer	T. Srinivasulu Reddy	Duration	334min (5 hour 34min)
Area Covered	–	Lengt Surveyed	185.697 km

Storage Details

INS Session	Session - 0	Laser HDD	71-0136
Photo HDD	SH2ANFOH502417D	Base Station	KRDCL-038-SCP, KRDCL-027-SCP, KRDCL-017-SCP

Flying Parameters

Altitude Above Ground	1000 feet	Aircraft Ground Speed	110kn
PRR	400KHZ	LiDAR & Camera FOV	60° & 53°

FL Number	Laser File Name		Remarks
	Session-0		
Test	071651		
-266	071939		
-262	072506		
-349	072506		
+385	073232		
-384	073419		
+243	073419		
-244	073806		
+248	074028		
-249	074254		
+245	074531		
-247	074915		
+246	075338		
-208	075752		

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KERALA RAIL DEVELOPMENT CORPORATION LIMITED

FL Number	Laser File Name			Remarks
−199	080323			
+200	080858			
−202	081421			
+201	082138			
−203	082816			
+203	083454			
+207	083820			
−205	084458			
+206	085046			

Operator

Security Officer

Scanned by CamScanner

GEO
KNO

KERALA RAIL DEVELOPMENT
CORPORATION LIMITED

Aerial LiDAR Survey for Thiruvananthapuram-Kasaragod Semi-High-Speed Rail Corridor

Date	04.01.2020	Mission	FLT-11
Starting Base	Trivandrum	Landing Base	Trivandrum
Engine On	12:16 PM	Engine Off	05:50 PM
Pilot	Capt. Tarali	Co-Pilot	Capt. Ashwani
AME	Dharmendra Singh	Lidar Engineer	Sathish Sekeran
Security Officer	T. Srinivasulu Reddy	Duration	334 min (5 hour 34 min)
Area Covered	–	Lengt Surveyed	63.035 km
Storage Details			
INS Session	Session -2	Laser HDD	TI-0136
Photo HDD	S41ANF0H502417D	Base Station	KRDCL-038-SCP, KRDCL-027-SCP, KRDCL-017-SCP
Flying Parameters			
Altitude Above Ground	1000 feet	Aircraft Ground Speed	110 kn
PRR	400 KHZ	LiDAR & Camera FOV	60° & 53°

FL Number	Laser File Name		Remarks
	Session-1		
	Session-2		
Test	090252		
-209	090358		
-253	091448		
+250	091907		
+251	090804		
-252	092202		
+255	092535		
-257	093031		
+254	093031		
-256	093652		
+357	094023		

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KERALA RAIL DEVELOPMENT CORPORATION LIMITED

KRDCL

FL Number	Laser File Name			Remarks

Operator

Security Officer

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GEO
KNO

**KERALA RAIL DEVELOPMENT
CORPORATION LIMITED**

Aerial LiDAR Survey for Thiruvananthapuram-Kasaragod Semi-High-Speed Rail Corridor

Date	04.01.2020	Mission	FLT-12
Starting Base	Trivandrum	Landing Base	Trivandrum
Engine On	12:16 PM	Engine Off	05:50 PM
Pilot	Capt. Tazali	Co-Pilot	Capt. Ashwani
AME	Dharmendra Singh	Lidar Engineer	Sathish Sekaran
Security Officer	T. Srinivasulu Reddy	Duration	334 min (5 hour 34 min)
Area Covered	–	Lengt Surveyed	240.64 km

Storage Details

INS Session	Session-3	Laser HDD	71-0136
Photo HDD	S42ANF0M502417D	Base Station	KRDCL-038-SCP, KRDCL-027-SCP, KRDCL-014-SCP

Flying Parameters

Altitude Above Ground	1000 feet	Aircraft Ground Speed	110 kn
PRR	400 kHz	LiDAR & Camera FOV	60° & 53°

FL Number	Laser File Name	Remarks
	Session-3	
+362	094830	
-352	094958	
+350	095229	
-351	095520	
-354	095918	
+355	100106	
-356	100336	
+259	100624	
+363	100624	
-265	101348	
-348	101736	
+346	101736	
-341	102310	
+347	102524	

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KERALA RAIL DEVELOPMENT CORPORATION LIMITED

FL Number	Laser File Name			Remarks
+264	102821			
-263	103208			
+258	103748			
-261	104217			
+260	104652			
+366	104652			
-364	104652			
-369	105502			
+370	105704			
-368	105854			
+369	110131			
+365	110348			
-353	110602			
+361	110845			
-360	111231			
+359	111710			
-358	112020			
+270	112439			
-269	113249			
+271	114045			
+338	114826			
-328	115216			

Operator

Security Officer

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GEO KNO

KERALA RAIL DEVELOPMENT CORPORATION LIMITED

Aerial LiDAR Survey for Thiruvananthapuram-Kasaragod Semi-High-Speed Rail Corridor

Date	05.01 2020	Mission	FLT-13
Starting Base	Trivandrum	Landing Base	Trivandrum
Engine On	11:46 AM	Engine Off	04 :25PM
Pilot	Capt. Taxali	Co-Pilot	Capt. Ashwani
AME	Dharmendra singh	Lidar Engineer	Sathish Sekaran
Security Officer	Ajith Kumar.V	Duration	279 min (4 hours 39 min)
Area Covered	—	Lengt Surveyed	348.966 km

Storage Details

INS Session	Session-0	Laser HDD	71-0136
Photo HDD	S41ANF0M502417D	Base Station	KRDCL-027-SCP, KRDCL-017-SCP, KRDCL-03-SCP

Flying Parameters

Altitude Above Ground	1000 feet	Aircraft Ground Speed	110kn
PRR	400 KHZ	LiDAR & Camera FOV	60° & 53°

FL Number	Laser File Name			Remarks
	Session-0			
Test	062041			
	062130			
+275	062220	-283	082740	
-276	062402	+295	083130	
-274	062402	+380	083527	
-284	062829	-301	083746	
-290	063144	-293	084036	
-299	063450	+291	084036	
-304	063450	+282	084621	
-312	064337	+287	085031	
+310	064533	-288	085031	
-308	064533	-281	085434	
+311	064947	+379	085434	
-309	064947	+294	090422	

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FL Number	Laser File Name			Remarks
+306	065355	-314	090422	
-307	065355	+317	090646	
+329	065643	-315	090829	
-337	065643	-303	091058	
-342	070358	+381	091458	
-274	070755	-325	091717	
+272	071130	+323	092028	
+343	071638	-324	092246	
+340	072136	-313	092610	
-334	072509	+327	092858	
-331	072509	-339	093206	
+330	073301			
-336	073301			
-345	074016			
+344	074536			
+335	075122			
-332	075122			
-383	075612			
+322	075612			
+302	080151			
+300	080151			
-296	080151			
+289	081251			
+280	081251			
+285	081649			
-278	082007			
+279	082237			
-286	082551			

Operator

Security Officer

GEO KNO

KERALA RAIL DEVELOPMENT CORPORATION LIMITED

Aerial LiDAR Survey for Thiruvananthapuram-Kasaragod Semi-High-Speed Rail Corridor

Date	05.01.2020	Mission	FLT-14
Starting Base	Trivandrum	Landing Base	Trivandrum
Engine On	11:46AM	Engine Off	04:25 PM
Pilot	Capt. Tarali	Co-Pilot	Capt. Ashwani
AME	Dharmendra Singh	Lidar Engineer	Sathish Sekaran
Security Officer	Ajith Kumar.V	Duration	279 min (4 hour 39 min)
Area Covered	–	Lengt Surveyed	63.469 km
Storage Details			
INS Session	Session-2	Laser HDD	71-0136
Photo HDD	S4QANF0MS02417D	Base Station	KRDCL-027-SCP, KRDCL-01T-SCP, KRDCL-03-SCP
Flying Parameters			
Altitude Above Ground	1000 feet	Aircraft Ground Speed	110 kn
PRR	400 KHZ	LiDAR & Camera FOV	60° & 53°

FL Number	Laser File Name		Remarks
	Session-1		
	Session-2		
Test	094256		
-273	094338		
+377	094929		
-374	094929		
+371	095256		
-373	095448		
+267	095730		
-268	100311		
+372	100859		
-378	101211		
+375	101434		
-376	101651		

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GEO
KNO

KERALA RAIL DEVELOPMENT CORPORATION LIMITED

FL Number	Laser File Name			Remarks

Operator

Security Officer

GEO KNO

KERALA RAIL DEVELOPMENT CORPORATION LIMITED

Aerial LiDAR Survey for Thiruvananthapuram-Kasaragod Semi-High-Speed Rail Corridor

Date	05.01.2020	Mission	FLT-15
Starting Base	Trivandrum	Landing Base	Trivandrum
Engine On	11:46 AM	Engine Off	04:25 PM
Pilot	Capt. Tazali	Co-Pilot	Capt. Ashwani
AME	Dharmendra Singh	Lidar Engineer	Sathish Sekaran
Security Officer	Ajith Kumar.V	Duration	279 min (4 hour 39 min)
Area Covered	—	Lengt Surveyed	29.296 km
Storage Details			
INS Session	Session-3	Laser HDD	71-0136
Photo HDD	S41ANF0M502417D	Base Station	KRDCL-027SCP, KRDCL-017-SCP KRDCL-03-SCP
Flying Parameters			
Altitude Above Ground	1000 feet	Aircraft Ground Speed	110 kn
PRR	400 KHZ	LiDAR & Camera FOV	60° & 53°

FL Number	Laser File Name		Remarks
	Session-3		
Test	102234		
	102348		
	104557		
	104741		
+333	102433		
-326	102816		
+382	103054		
+305	103355		
+316	103735		
+297	104030		
+292	105027		

Scanned by CamScanner

GEO KNO

KERALA RAIL DEVELOPMENT CORPORATION LIMITED

FL Number	Laser File Name			Remarks

Operator

Security Officer

DAILY DATA TRANSFER RECORDS

Data Security proceedings drawn on 05.01.2020 at 11.30 pm in the office of the KRDCL, Annex office Building,Vazhuthakad, Thiruvananthapuram -14, Kerala State for the work of "Conducting Aerial LiDAR Survey of Thiruvananthapuram – Kasaragod Semi-High Speed Rail Project".

Members Present:

1. Mr. Prasanth. S, SE/KRDCL and Security Officer
2. Mr. DhaneshAravind, SE/KRDCL and Security officer
3. Mr. SathishSekaran, Instrument operator / Geokno
4. Mr. KarthickPalanimuthu, Data Capturing Engineer / Geokno

The team member 1 has reached the Trivandrum Airport today (05.01.2020) at 10. 30 am. Mr. V.Ajith Kumar, MD/KRDCL was the Onboard Security officer today (5.01.2020)and Mr. SathishSekaran, Instrument operator / Geokno hasdone theData capturing.

The Security officer Mr. Prasanth. S, SE/KRDCL has handed over the Storage Devices vide Sl.No: 11, 13, 15 and 17 of Annexure- I to the onboard Security officer at Trivandrum Airport and Mr. SathishSekaran has loaded them in the Aerial LiDAR unit. Aircraft had the take off at 11.50hrs. Data capturing was done between Chengannurand Trivandrum.

After data capturing, Aircraft landed in Trivandrum Airport at 16.33Hrstoday (05.01.2020) evening. All storage devices were removed from Aircraft and Mr.V.Ajith Kumar, MD/KRDCLand Onboard Security officer has handed over above storage devicesand LAPTOP - to Mr. Prasanth. S, SE/KRDCL and Security Officer at Trivandrum Airport. Mr. Prasanth. S, SE/KRDCL has brought above Storage Devices to KRDCL Annex Office, Vazhuthakadand he reached at 17.20Hrstoday (05.01.2020) evening.

Mr. KarthickPalanimuthu, Data Capturing Engineer / Geoknohas come to KRDCL Office, Vazhuthakad at 17.20 hrs for the data transfer from above storage devices in to External Hard Drives.

The Data available in Sl. No: 11, 15 and 17 of Annexure- I were transferred in the External Hard drives No: NAAQKC2P and NAAQKMS8(2 copies) by using LAPTOP – DEL LATITUDE E7470 JWKCVF2.

Mr. KarthickPalanimuthu, Data Capturing Engineer / Geokno has stated that the storage device No: S1SUNSAG318963P (Sl. No:13 of Annexure-I) contains system information data and this data is not required for any Pre/ Post processing or any other requirement. Hence the data available in this storage device was copied in above External Hard drives No: NAAQKC2P and NAAQKMS8 duly assigning the folder name as "LASER LOG SSD"and then the device was formatted and made as empty.

(Continued to page -2)

1.	2. 05/01/2020	3.	4. P. Karthick
Mr.Prasanth.S SE/CIVIL/KRDCL	Mr. DhaneshAravind SE/CIVIL/KRDCL	Mr. SathishSekaran Instrument operator/ Geokno	Mr. KarthickPalanimuthu, Data Capturing Engineer / Geokno

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Data transfer commenced today (05.01.2020) evening at 18.25hrs and completed at 23.00hrs.Deleting of all data from the storage devices vides Sl. No: 11, 15 and 17 of Annexure- I were completed at 23.20hrs. Multiple formatting was done and ensured that there is no data exist in above storage devices.

After ensuring that all data were fully deleted. All storage devices vide sl.11 to 17 of Annexure- I and LAPTOP – DEL LATITUDE E7470 JWKCVF2 were handed over to Mr. KarthickPalanimuthu, Data Capturing Engineer / Geokno for safe custody.

The External Hard Drive No: NAAQKC2P -2 TB and NAAQKMS8 – 2 TB(2 copies) were also taken under custody of Mr. DhaneshAravind, SE/KRDCL and Security Officer and kept under Lock and key.

All team members withdrew.

(Proceedings prepared by me)

(N.VELAYUDHAN)
SSE/KRDCL

1.	2. 05/01/2020	3.	4. P.Karthick
Mr.Prasanth.S SE/CIVIL/KRDCL	Mr. DhaneshAravind SE/CIVIL/KRDCL	Mr. SathishSekaran Instrument operator/ Geokno	Mr. KarthickPalanimuthu, Data Capturing Engineer / Geokno

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ANNEXURE - I

KRDCL

S.NO	DESCRIPTION	SERIAL NUMBER	REMARKS
1	DIGICAM ✓	61-0101	AERIAL CAMERA
2	AEROCONTROL UNIT ✓	51-0118	CPU UNIT
3	SMU 2 UNIT ✓	51-0126, 51-0115 ✗	
4	CONNECT XT ✓	51-0132 ✗	
5	IMU ✓	51-0139	NAVIGATION DEVICE
6	LASER SCANNER ✓	61-0106	LIDAR SENSOR
7	LASER DATA RECORDER ✓	P/N : LAS-41-000-05133	LIDAR DATA STORAGE UNIT
8	CCNS-5 DISPLAY ✓	61-0226 (PILOT) & 13-0147 (OPERATOR)	CONTROL MONITORS
9	DIGICAM CONTROLLER DISPLAY ✓	61-0129	
10	LITEMAPPER CONTROLLER DISPLAY ✓	61-0130	
STORAGE DEVICES			
11	DIGICAM SSD	S41ANF0M502417D ✓	1 TB
12	DIGICAM SSD	S419NGAK403157Z ✓	512 GB
13	LASER LOG SSD	S1SUNSAG318963P ✓	256 GB
14	AEROCONTROL DATA CARD	QS3N116 ✓	8 GB
15	AEROCONTROL DATA CARD	QS3N109 ✓	8 GB
16	LASER SSD	61-0127, 28, 29 ✓	800 GB * 3
17	LASER SSD	71-0136, 37, 38 ✓	800 GB * 3
18	GNSS ANTENNA	463360 ✓	GPS ANTENNA

US

Sathish

LAPTOP FOR DATA TRANSFER	DELL LATITUDE E7470 ✓
	JWKCVF2 ✓

EXTERNAL HARD DRIVES		
S.NO	SERIAL NUMBER	CAPACITY
1	NAAQKBV4 ✓	2 TB ✓
2	NAAQKBVE ✓	2 TB ✓
3	NAAQKBSM ✗ ✓	2 TB ✓
4	NAAQKBSP ✗ ✓	2 TB ✓
5	NAAQKMS8 ✓	2 TB ✓
6	NAAQKC2T ✓	2 TB ✓
7	NAAQKBXM ✓	2 TB ✓
8	NAAQKC2P ✗ ✓	2 TB ✓
9	NAAQ5K5Y ✗ ✓	2 TB ✓
10	NAAQHPLX ✓	2 TB ✓

1. (Prasanth, S)
SE/CIVIL/KRDCL

2. 05/01/2020
(Dhanesh Aravind)
SE/CIVIL/KRDCL

3. (Sathish Sekaran)
Instrument operator
Geokno

4. P. Karthick
(Mr. Karthick Palaniyappan)
Data capturing - Engineer/
Geokno.

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Data Security proceedings drawn on 05.01.2020 at 3.30 am in the office of the KRDCL, Annex office Building, Vazhuthakad, Thiruvananthapuram -14, Kerala State for the work of "Conducting Aerial LiDAR Survey of Thiruvananthapuram – Kasaragod Semi-High Speed Rail Project".

Members Present:

1. Mr. Prasanth. S, SE/KRDCL and Security Officer
2. Mr. Dhanesh Aravind, SE/KRDCL and Security officer
3. Mr. Y.Srinivasulu Reddy, Sr.Surveyor and onboard Security Officer
4. Mr. SatheshSekaran, Instrument operator / Geokno
5. Mr. Rajasubramani, Data Capturing Engineer / Geokno

The team members 2, 3and 4have reached the Trivandrum Airport 10. 40 am on 04.01.2020. Mr. Y.Srinivasulu Reddy, Sr.Surveyor was the Onboard Security officer and Mr. Sathesh Sekaran, Instrument operator / Geokno has done the Data capturing on yesterday (04.01.2020).

The Security officer Mr. Dhanesh Aravind, SE/KRDCL has handed over the Storage Devices vide Sl.No: 11, 13, 15 and 17 of Annexure- I to the onboard Security officer at Trivandrum Airport and Mr. Sathesh Sekaran has loaded them in the Aerial LiDAR unit. Aircraft had the take off at 12.22hrs on yesterday (04.01.2020). Data capturing was done between Kochin and Chengannur.

After data capturing, Aircraft landed in Trivandrum Airport at 17.50Hrs on yesterday (04.01.2020) evening. All storage devices were removed from Aircraft and Mr. Y.Srinivasulu Reddy, Sr.Surveyor and Onboard Security officer has handed over above storage devicesand LAPTOP - to Mr. Prasanth. S, SE/KRDCL and Security Officer at Trivandrum Airport. Mr. Prasanth. S, SE/KRDCL has brought above Storage Devices to KRDCL Annex Office, Vazhuthakad and he reached at 18.30 Hrs of yesterday (04.01.2020) evening.

Mr. Rajasubramani , Data Capturing Engineer / Geokno has come to KRDCL Office, Vazhuthakad at 19.15 Hrs for the data transfer from above storage devices in to External Hard Drives.

The Data available in Sl. No: 11, 15 and 17 of Annexure- I were transferred in the External Hard drives No: NAAQKBV4 and NAAQ5K5Y(2 copies) by using LAPTOP – DEL LATITUDE E7470 JWKCVF2.

Mr. Rajasubramani, Data Capturing Engineer / Geokno has stated that the storage device No: S1SUNSAG318963P (Sl. No:13 of Annexure-I) contains system information Data and this data shall neither be copied nor to be deleted from the storage device and shall be continued to use for the next day data capturing.

(Continued to page -2)

1.	2. 05/01/2020	3.	4.	5. 05/01/2020
Mr.Prasanth.S SE/CIVIL/KRDCL	Mr. DaneshAravind SE/CIVIL/KRDCL	Mr. Y.Srinivasulu Reddy, Sr.Surveyor	Mr. SatheshSekaran Instrument operator/ Geokno	Mr. Rajasubramani, Data Capturing Engineer / Geokno

Scanned by CamScanner

Data transfer commenced yesterday (04.01.2020) night at 20.10Hrs and completed on today (05.01.2020) early morning at 2.30am.Deleting all data from the storage devices vides Sl. No: 11, 15 and 17 of Annexure- I were completed at 3. 00 am. Multiple formatting was done and ensured that there is no data exist in above storage devices. After ensuring that all data were fully deleted, above storage devices were taken under safe custody of Mr. Danesh Aravind, SE/KRDCL and Security Officer for the use of today.

Data available in storage device No: S1SUNSAG318963P (Sl. No:13 of Annexure-I) was not transferred and it was kept asities for data capturing on today.

The External Hard Drive No: NAAQKBV4 – 2 TB and NAAQ5K5Y – 2 TB (2 copies) were also taken under custody of Mr. Danesh Aravind, SE/KRDCL and Security Officer and kept under Lock and key.

(Proceedings prepared by me)

(N.VELAYUDHAN)
SSE/KRDCL

1.	2. 05/01/2020	3.	4.	5. 05/01/2020
Mr.Prasanth.S SE/CIVIL/KRDCL	Mr. DaneshAravind SE/CIVIL/KRDCL	Mr. Y.Srinivasulu Reddy, Sr.Surveyor	Mr. SatheshSekaran Instrument operator/ Geokno	Mr. Rajasubramani, Data Capturing Engineer / Geokno

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ANNEXURE-I

KRDCL

S.NO	DESCRIPTION	SERIAL NUMBER	REMARKS
1	DIGICAM ✓	61-0101	AERIAL CAMERA
2	AEROCONTROL UNIT ✓	51-0118	CPU UNIT
3	SMU 2 UNIT ✓	51-0126, 51-0115 ×	
4	CONNECT XT ✓	51-0132 ×	
5	IMU ✓	51-0139	NAVIGATION DEVICE
6	LASER SCANNER ✓	61-0106	LIDAR SENSOR
7	LASER DATA RECORDER ✓	P/N : LAS-41-000-05133	LIDAR DATA STORAGE UNIT
8	CCNS-5 DISPLAY ✓	61-0226 (PILOT) & 13-0147 (OPERATOR)	CONTROL MONITORS
9	DIGICAM CONTROLLER DISPLAY ✓	61-0129	
10	LITEMAPPER CONTROLLER DISPLAY ✓	61-0130	
STORAGE DEVICES			
✓ 11	DIGICAM SSD	S41ANF0M502417D ✓	1 TB
12	DIGICAM SSD	S419NGAK403157Z ✓	512 GB
✓ 13	LASER LOG SSD	S1SUNSAG318963P ✓	256 GB
14	AEROCONTROL DATA CARD	QS3N116 ✓	8 GB
✓ 15	AEROCONTROL DATA CARD	QS3N109 ✓	8 GB
16	LASER SSD	61-0127, 28, 29 ✓	800 GB * 3
17	LASER SSD	71-0136, 37, 38 ✓	800 GB * 3
18	GNSS ANTENNA	463360 ✓	GPS ANTENNA

LAPTOP FOR DATA TRANSFER	DELL LATITUDE E7470 ✓ JWKCVF2 ✓

EXTERNAL HARD DRIVES

S.NO	SERIAL NUMBER	CAPACITY
1	NAAQKBV4 ✓	2 TB ✓
2	NAAQKBVE ✓	2 TB ✓
✓ 3	NAAQKBSM × ✓	2 TB ✓
✓ 4	NAAQKBSP × ✓	2 TB ✓
5	NAAQKMS8 ✓	2 TB ✓
6	NAAQKC2T ✓	2 TB ✓
7	NAAQKBXM ✓	2 TB ✓
8	NAAQKC2P × ✓	2 TB ✓
9	NAAQ5K5Y × ✓	2 TB ✓
10	NAAQHPLX ✓	2 TB ✓

1. (Mr. S. Prasath. S)
SE/Civil/KRDCL

2. 05/01/2020
(Mr. Dhanesh Anand)
SE/Civil (KRDCL)

3. Mr. Y. Srinivasulu Reddy,
Sr. Surveyor

4. (Mr. Satheesh Sekaran)
Instrument operator/ Geokno

5. P. Raja 05/01/2020
(Mr. Raja subramani)
Data Capturing Engineer/
Geokno.

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Data Security proceedings drawn on 03.01.2020 at 23.50 Hrs in the office of the KRDCL, Annex office Building, Vazhuthakad, Thiruvananthapuram -14, Kerala State for the work of "Conducting Aerial LiDAR Survey of Thiruvananthapuram – Kasaragod Semi-High Speed Rail Project".

Members Present:

1. Mr. Prasanth. S, SE/KRDCL and Security Officer
2. Mr. Danesh Aravind, SE/KRDCL and onboard Security officer
3. Mr. Sathesh Sekaran, Instrument operator / Geokno
4. Mr. Rajasubramani, Data Capturing Engineer / Geokno

The team members 2 and 3 have reached the Kannur Airport 8. 10 am. Mr. Danesh Aravind, SE/KRDCL was the Onboard Security officer and Mr. Sathesh Sekaran, Instrument operator / Geokno has done the Data capturing today (03.01.2020).

The Onboard Security officer Mr. Danesh Aravind, SE/KRDCL has handed over the Storage Devices vide Sl. No: 11, 13, 15 and 17 of Annexure- I to Mr. Sathesh Sekaran and he has loaded them in the Aerial LiDAR unit. Aircraft had the take off at 10.29 am. Data capturing was done between Trissur and Kochin.

After data capturing, Aircraft landed in Trivandrum Airport at 15.58 Hrs. All storage devices were removed from Aircraft and Mr. Danesh Aravind, SE/KRDCL and Onboard Security officer has taken over above storage devices in the custody. Mr. Prasanth. S, SE/KRDCL and Security Officer & Mr. N.Velayudhan, SSE/KRDCL have started from Kannur by Jan Shatabdi Express train today (03.01.2020) early morning and reached KRDCL Office, Vazhuthakad at 16.30 Hrs.

Mr. Rajasubramani , Data Capturing Engineer / Geokno has come to KRDCL Office, Vazhuthakad at 16.35 Hrs for the data transfer from above storage devices in to External Hard Drives.

Above Onboard Security officer has brought the storage devices and LAPTOP – DEL LATITUDE E7470 JWKCVF2 to KRDCL office, 5th Floor, TRANS Tower, Vazhuthakad, Trivandrun -14 and handed over them to Mr. Prasanth .S, SE/KRDCL and Security Officer at about 16.40 Hrs.

Team members vide Sl.No.1 and 4 have come to the KRDCL Annex. office, Vazhuthakad at about 18.00 hrs. The Data available in Sl. No: 11, 15 and 17 of Annexure- I were transferred in the External Hard drives No: NAAQKBVE and NAAQHPLX (2 copies) by using LAPTOP – DEL LATITUDE E7470 JWKCVF2.

Mr. Rajasubramani, Data Capturing Engineer / Geokno has stated that the storage device No: S1SUNSAG318963P (Sl. No:13 of Annexure-I) contains system information Data and this data shall neither be copied nor to be deleted from the storage device and shall be continued to use for the next day data capturing.

(Continued to page 2)

1.	2. 03/01/2020	3.	4. 03/01/2020
Mr.Prasanth.S SE/CIVIL/KRDCL	Mr. Danesh Aravind SE/CIVIL/KRDCL	Mr. Sathesh Sekaran Instrument operator/ Geokno	Mr. Rajasubramani, Data Capturing Engineer / Geokno

Scanned by CamScanner

Data transfer commenced at 18.45 Hrs and completed at 23.00 hrs. Deleting all data from the storage devices vides Sl. No: 11, 15 and 17 of Annexure- I were completed at 23.40 hrs. Multiple formatting was done and ensured that there is no data exist in above storage devices. After ensuring that all data were fully deleted, above storage devices were taken under safe custody of Mr. Prasanth. S, SE/KRDCL and Security Officer for the use of next day.

Data available in storage device No: S1SUNSAG318963P (Sl. No:13 of Annexure-I) was not transferred and it was kept asities for data capturing on the next day.
The External Hard Drive No: NAAQKBVE – 2 TB and NAAQHPLX - 2 TB (2 copies) were also taken under custody of Mr. Prasanth.S, SE/KRDCL and Security Officer and kept under Lock and key.

(Proceedings prepared by me)

(N.VELAYUDHAN)
SSE/KRDCL

1.	2. 03/01/2020	3.	4. 03/01/2020
Mr.Prasanth.S SE/CIVIL/KRDCL	Mr. Danesh Aravind SE/CIVIL/KRDCL	Mr. Sathesh Sekaran Instrument operator/ Geokno	Mr. Rajasubramani, Data Capturing Engineer / Geokno

Scanned by CamScanner

Annexure-I

KRDCL

S.NO	DESCRIPTION	SERIAL NUMBER	REMARKS
1	DIGICAM	61-0101	AERIAL CAMERA
2	AEROCONTROL UNIT	61-0118	CPU UNIT
3	SMU 2 UNIT	61-0126, 61-0116	
4	CONNECT XT	61-0132	
5	IMU	61-0139	NAVIGATION DEVICE
6	LASER SCANNER	61-0106	LIDAR SENSOR
7	LASER DATA RECORDER	P/N : LAS-41-000-05133	LIDAR DATA STORAGE UNIT
8	CCNS-5 DISPLAY	61-0226 (PILOT) & 13-0147 (OPERATOR)	CONTROL MONITORS
9	DIGICAM CONTROLLER DISPLAY	61-0129	
10	LITEMAPPER CONTROLLER DISPLAY	61-0130	
STORAGE DEVICES			
11	DIGICAM SSD	S41ANF0M502417D	1 TB
12	DIGICAM SSD	S419NGAK403157Z	512 GB
13	LASER LOG SSD	S1SUNSAG318963P	256 GB
14	AEROCONTROL DATA CARD	QS3N116	8 GB
15	AEROCONTROL DATA CARD	QS3N109	8 GB
16	LASER SSD	61-0127, 28, 29	200 GB * 3
17	LASER SSD	71-0136, 37, 38	200 GB * 3
18	GNSS ANTENNA	483360	GPS ANTENNA

Sathis

LAPTOP FOR DATA TRANSFER	DELL LATITUDE E7470 JWKCVF2

EXTERNAL HARD DRIVES		
S.NO	SERIAL NUMBER	CAPACITY
1	NAAQKBV4	2 TB
2	NAAQKBVE	2 TB
3	NAAQKBSM	2 TB
4	NAAQKBSP	2 TB
5	NAAQKMS8	2 TB
6	NAAQKC2T	2 TB
7	NAAQKBXM	2 TB
8	NAAQKC2P	2 TB
9	NAAQ5K5Y	2 TB
10	NAAQHPLX	2 TB

P. Raja
03/01/2020

1. (Mr. Prasath. S)
SSE/KRDCL

2. 09/01/2020
(Mr. Danesh Aravind)
SSE/KRDCL

3. (Mr. Sathesh Sekeran)
Instrument operator
Geokno

4. (Mr. Rajasubramani)
Data capturing
Engineer/
Geokno.

Scanned by CamScanner

Data security proceedings drawn on 02.01.2020 at 11.15 ~~Hrs~~ PM in the accommodation of Security officers/KRDCL and Geokno's Instrument operator/Data capturing Engineer at Sri Devi Garden, Maruthai near Mattanur, Kerala state for the work of "conducting Aerial LiDAR survey for Trivandrum - Kasaragod semi-Hight speed Rail project"

Members Present :

1. Mr. Prasanth.S - SE/KRDCL and Security officer
2. Mr. Danesh Aravind - SE/KRDCL and Security officer
3. Mr. Sathesh Sekaran, Instrument operator/Geokno
4. Mr. Karthick Palanimuthu, Data Capturing Engineer/Geokno.

—·—

Mr. C.C. Joy, ~~AGM~~/KRDCL is the onboard security officer during today's Data Capturing. Above team members 1, 2, 3 and onboard security officer reached Kannur Airport at 8.00 AM. Mr. Prasanth.S, SE/KRDCL and Security officer has handedover the storage devices vide Sl.No. 11, 13, 15 and 17 of Annexure-I to Mr. Sathesh Sekaran/Instrument operator at Airport Boarding Gate in the presence of onboard security officer. Above storage Devices taken in to Aircraft and loaded in the Aerial LiDAR unit in the presence of above onboard security officer.

Aircraft Take off at 10.13 AM. Data Capturing was done from Elathur to Trissur. Aircraft Landed at Kannur Airport at 14.48 Hrs. All storage devices were removed from Aircraft and handedover to Mr. Prasanth, SE/KRDCL and Security officer.

Team members 1, 2, 3 and onboard security officer reached the accomodation at Sri Devi Garden, Maruthai at about 15.30 Hrs.

(continued to Page-2)

1. (Mr. Prasanth. S)
SE/CIVIL/KRDCL

2. 02/01/2020
(Mr. Danesh Aravind)
SE/CIVIL/KRDCL

3. Sathish
(Mr. Sathesh Sekaran)
Instrument Operator/
Geokno

4. P. Karthick
(Mr. Karthick Palanimuthu)
Data capturing Engineer/
Geokno.

Scanned by CamScanner

After refreshment, Mr. Prasath. S. SE/KRDCL and Security Officer has given above storage devies to Mr. Karthick Palanimuthu, Data Capturing Engineer/Geokno for Data Transfer into External Hard Drives using the Laptop - DELL LATITUDE E7470 JWKCVF2.

The Data available in the storage devices vide Sl.Nos. 11, 15 and 17 were copied into the External Hard Drives No. NAAQKBXM - 2TB and NAAQKC27 - 2TB (2 copies)

Mr. Karthick Palanimuthu, LiDAR DATA CAPTURING ENGINEER/ Geokno has stated that the storage Device No: S1SUNSAG 318963P (Sl.No.13 of Annexure-I) contains system information Data and this data shall neither be copied nor to be deleted from the storage device and shall be continued to use for the next day data capturing.

Data ~~capturing~~ copying commenced at 16.30Hrs and completed at 21.30 Hrs. Deleting of all data from the storage device vide Sl.No:11, 15 and 17 were completed at 23.00Hrs. Multiple formating was done and ensured that there is no data exist in above storage Device. After ensuring that all data were fully deleted, above storage devices were taken under safe custody of Mr. Danesh Aravind, SE/KRDCL and security officer for the use of next day.

Data available in storage device No. S1 SUNSAG 318963P was not transfered and it was kept as it is for data capturing on the next day. ~~Data available~~ The external hard drives Nos. NAAQKBXM - 2TB and NAAQKC2T - 2TB (2 copies) were also taken under custody of Mr. Danesh Aravind, SE/KRDCL and Security officer and kept under lock and key.

(Proceedings prepared by me)
Lendo
02.1.2020

1.
Mr. Prasanth. S
SE/CIVIL/KRDCL

2.
02/01/2020
(Mr. Danesh Aravind)
SE/CIVIL/KRDCL

3. Sathish
(Mr. Sathish Sekaran)
Instrument operator/
Geokno

4. Karthick
(Mr. Karthick Palanimuthu)
Data Capturing Engineer/
Geokno

Scanned by CamScanner

ANNEXURE-I

KRDCL

S.NO	DESCRIPTION	SERIAL NUMBER	REMARKS
1	DIGICAM	61-0101	AERIAL CAMERA
2	AEROCONTROL UNIT	51-0118	CPU UNIT
3	SMU 2 UNIT	51-0126, 51-0115	
4	CONNECT XT	51-0132	
5	IMU	51-0139	NAVIGATION DEVICE
6	LASER SCANNER	61-0106	LiDAR SENSOR
7	LASER DATA RECORDER	P/N : LAS-41-000-05133	LiDAR DATA STORAGE UNIT
8	CCNS-5 DISPLAY	61-0226 (PILOT) & 13-0147 (OPERATOR)	CONTROL MONITORS
9	DIGICAM CONTROLLER DISPLAY	61-0129	
10	LITEMAPPER CONTROLLER DISPLAY	61-0130	
STORAGE DEVICES			
11	DIGICAM SSD	S41ANF0M502417D	1 TB
12	DIGICAM SSD	S419NGAK403157Z	512 GB
13	LASER LOG SSD	S1SUNSAG318963P	256 GB
14	AEROCONTROL DATA CARD	QS3N116	8 GB
15	AEROCONTROL DATA CARD	QS3N109	8 GB
16	LASER SSD	61-0127, 28, 29	800 GB * 3
17	LASER SSD	71-0136, 37, 38	800 GB * 3
18	GNSS ANTENNA	463360	GPS ANTENNA

LAPTOP FOR DATA TRANSFER	DELL LATITUDE E7470 JWKCVF2

EXTERNAL HARD DRIVES		
S.NO	SERIAL NUMBER	CAPACITY
1	NAAQKBV4	2 TB
2	NAAQKBVE	2 TB
3	NAAQKBSM	2 TB
4	NAAQKBSP	2 TB
5	NAAQKMS8	2 TB
6	NAAQKC2T	2 TB
7	NAAQKBXM	2 TB
8	NAAQKC2P	2 TB
9	NAAQ5K5Y	2 TB
10	NAAQHPLX	2 TB

1\.
(Mr. Prasanth. S)
SE/CIVIL /KRDCL

2. 02/01/2020
(Mr- Danesh Aravind)
SE/CIVIL /KRDCL

3. Sathish
(Mr. Sathesh Sekaran)
Instrument operator/
Geokno

4. P. Karthick
(Mr. Karthick Palanimur
Data Capturing Engineer/
Geokno

Data security procedings drawn on 01.01.2020 at 23.10 Hrs in the accomodation of Security officers/KRDCL and Geokno's Instrument operator/Data capturing Engineers at Sri Devi Garden, Maruthai, near Mattanur, Kerala state for the work of "conducting Aerial LiDAR Survey of Thiruvananthapuram - Kasargod Semi High Speed Rail project."

Members present :

1. Mr. Prasanth. S, SE/KRDCL and Security officer
2. Mr. Danesh Aravind, SE/KRDCL and onboard Security officer
3. Mr. Sathesh Sekaran, Instrument operator/Geokno
4. Mr. Karthick Palanimuthu, Data capturing Engineer/Geokno

—o—

The team members ① to ③ have reached the Kannur Airport at 8.00 AM. Mr. Danesh Aravind SE/KRDCL was the onboard Security officer for Data captering today (01.01.2020).

The onboard security officer Mr. Danesh Aravind, SE/KRDCL has handedover the storage Devices vide Sl. No. 11, 13, 15 and 17 of Annexure-I to Mr. Sathesh-Sekaran and he has loaded them in the Aerial LiDAR unit. Aircraft Take off at 10.54 AM and Data capturing was done from Kannur to Elathur. Aircraft Landed at 14.48 Hrs in Kannur Airport and the onboard security officer has brought the storage devices to his accommodation. Sl. No. 1, 2 and 3 of above team members have reached in their accommodation in Sri Devi Garden, Maruthai at about 15.30 Hrs.

(continued to Page-2)

(Mr. Prasanth. s)

2. 01/01/2020 (Mr. Danesh Aravind)

3. (Mr. Suthish Sekaran)

4. (Mr. Karthick Palanimuthu)

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(Page-2)

After refreshment, the onboard Security officer has given above storage devices to Mr. Karthick Palanimuthu, Data Capturing Engineer / Geokno for data transfer into External Hard Drives using the Laptop- DELL LATITUDE E 7470 JWKCVF2

The Data available in storage devices vide Sl.Nos. 11, 15 and 17 were copied in to the External Hard Drives NO. NAAQKBXM-2TB and NAAQKC2T-2TB (2 copies)

Mr. Karthick Palanimuthu, LIDAR Data capturing Engineer has stated that the Storage Device No. SISUNSAG 318963P (Sl.No.13 of Annexure-I) contains system information Data and this data shall neither be copied in the External Hard Drives nor to be deleted from the same and this device shall be continued to use for the next day data capturing.

Data copying commenced at 16.30 Hrs and completed at 20.45 Hrs. Deleting all data from above Storage Devices vide Sl.No. 11, 15 and 17 were completed at 22.00 Hrs. Multiple formating was done and ensured that there is no data exist in above Storage Devices. After ensuring that all the data were fully deleted, above storage devices were taken under custody of Mr. Danesh Aravind, SE/KRDCL and Security Officer for the use of next day.

Data available in storage device No. SISUNSAG 318963P (Sl.No.13 of Annexure-I) was not transfered and it was kept as it is for data capturing on next day.

(continued to Page-3)

1. 2. 01/01/2020 3. 4.

(Mr. Prasath. S) (Mr. Danesh Aravind) (Mr. Sathish Sekaram) (Mr. Karthick Palanimuthu) the external hard drives Nos. NAAQKBXM-2 TB and NAAQKC2T-2TB (2 copies) were also taken under custody of Mr. Danesh Aravind, SE/KRDCL and Security Officer and kept under lock and key.

Mr. Manikandan, PM/Geokno gave a request letter addressed to the MD/KRDCL to permit Geokno for preliminary data processing to facilitate early security vetting by SOI and MOD as per the instructions/standard stipulations (conditions) for conduct of Aerial LiDAR Survey/Photography using Aircrafts/UAVs of MOD under Clause (XV).

Proceedings prepared by me
N. VELAYUDHAN

Encl: Annexure-I.

1. (Mr. Prasath. S)
SE/KRDCL

2. 01/01/2020
(Mr. Danesh Aravind)
SE/KRDCL

3. (Mr. Sathish Sekaran)
Instrument operator/Geokno

4. (Mr. Karthick Palanimuthu)
Data capturing Engineer/Geokno

ANNEXURE - I

KRDCL

S.NO	DESCRIPTION	SERIAL NUMBER	REMARKS
1	DIGICAM	61-0101	AERIAL CAMERA
2	AEROCONTROL UNIT	51-0118	CPU UNIT
3	SMU 2 UNIT	51-0126, 51-0115	
4	CONNECT XT	51-0132	
5	IMU	51-0139	NAVIGATION DEVICE
6	LASER SCANNER	61-0106	LIDAR SENSOR
7	LASER DATA RECORDER	P/N : LAS-41-000-05133	LIDAR DATA STORAGE UNIT
8	CCNS-5 DISPLAY	61-0226 (PILOT) & 13-0147 (OPERATOR)	CONTROL MONITORS
9	DIGICAM CONTROLLER DISPLAY	61-0129	
10	LITEMAPPER CONTROLLER DISPLAY	61-0130	
STORAGE DEVICES			
11	DIGICAM SSD	S41ANF0M502417D	1 TB
12	DIGICAM SSD	S419NGAK403157Z	512 GB
13	LASER LOG SSD	S1SUNSAG318963P	256 GB
14	AEROCONTROL DATA CARD	QS3N116	8 GB
15	AEROCONTROL DATA CARD	QS3N109	8 GB
16	LASER SSD	61-0127, 28, 29	800 GB * 3
17	LASER SSD	71-0136, 37, 38	800 GB * 3
18	GNSS ANTENNA	463360	GPS ANTENNA

Sathesh

LAPTOP FOR DATA TRANSFER	DELL LATITUDE E7470
	JWKCVF2

EXTERNAL HARD DRIVES		
S.NO.	SERIAL NUMBER	CAPACITY
1	NAAQKBV4	2 TB
2	NAAQKBVE	2 TB
3	NAAQKBSM	2 TB
4	NAAQKBSP	2 TB
5	NAAQKMS8	2 TB
6	NAAQKC2T	2 TB
7	NAAQKBXM	2 TB
8	NAAQKC2P	2 TB
9	NAAQ5K5Y	2 TB
10	NAAQHPLX	2 TB

1. (Prasath. S)

2. 01/01/2020 (Mr. Dansh Aravind) SE | KRDCL

3. (Mr. Sathesh Sekaram) Instrument operator | Geokno

4. P. Karthick (Mr. Karthick Palani) Data Capturing Engineer / Geokno

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(Page - 1)

Data Security Procedings drawn on 31.12.2019 at 22.30 Hrs in the accomodation of Security officers/KRDCL and Geokno's Instrument operator/Data Capturing Engineers at Sri Devi Garden, Maruthai, near Mattanur, Kerala state for the work of "Conducting Aerial LiDAR Survey of Thiruvananthapuram - Kasargod Semi High Speed Rail project".

Members present:

1. Mr. Prasanth. S, SE/KRDCL and Security officer,
2. Mr. Danesh Aravind, SE/KRDCL and Security officer,
3. Mr. Sathish Sekaran, Instrument operator/Geokno
4. Mr. Karthick Palanimuthu, Data capturing Engineer/Geokno

— - —

The team members ① to ③ have reached the Aircraft available in Kannur Airport at about 8.45 AM. Mr. Prasanth. S - SE/KRDCL was the onboard security officer for data capturing.

The onboard Security officer Mr. Prasanth. S has handedover the storage Devices vide Sl. No. 11, 13, 15 and 17 of Annexure - I to Mr. Sathish Sekaran and he has loaded them in the Aerial LiDAR unit. Aircraft take off at 9.33 AM and Data capturing started.

Data capturing commenced at about 9.40 AM from Kannur and done up to Kasargod. Datacapturing was done up to 13.45 Hrs. and Aircraft landed in Kannur Airport at about 14.00 Hrs. Above storage Devices vide Sl. No. 11, 13, 15 and 17 were removed from the Aerial LiDAR unit and taken under the custody of onboard security officer/KRDCL.

Sl. Nos. 1, 2 and 3 of above team members reached their accomodation, Sri Devi Garden, Maruthai at 14.45 Hrs.

(continued to Page - 2)

1. 31/12/19 (Mr. Prasanth. S)
2. 31/12/19 (Mr. Danesh Aravind)
3. (Mr. Sathish Sekaran)
4. (Mr. Karthick Palanimuthu)

Scanned by CamScanner

(Page-2)

After refreshment, the onboard Security officer has given above storage devies to Mr. Kartnick Palanimuthu - Data capturing Engineer/Geokno for copying in to external Hard Drives using the LapTop for Data Transfer - DELL LATITUDE E7470 - JWKCVF2.

The Data available in storage devices vide Sl. No. 11, 15 and 17 were copied in to the External Hard Drives No: NAAQKBSM_2TB and NAAQBSP-2TB (2 copies).

Mr. Karthick Palanimuthu, LiDAR Data Capturing Engineer has stated that the storage Device No. S1SUNSAG 318963P (Sl. No. 13) contains system Information Data and ~~available in~~ this data shall neither be copied in the External Hard Drives nor ~~to~~ be deleted from the same and shall be continued to use for the next day data capturing.

Data copying commenced at 16.00 Hrs and completed at 20.20 Hrs. Deleting all data from above Storage Devices vide Sl. No. 11, 15 and 17 were completed at 22.15 Hrs. Multiple formating was done and ensured that there is no data exist in above storage devices. After ensuring that all data were fully deleted, above storage devices were taken under custudy of Mr. Danesh Aravind, SE/KRDCL and Security Officer for the next day use.

Data available in storage Device No. S1SUNSAG 318963P (Sl. No. 13 of Annexure-I) was not transfered to any External Hard Drives and it was used for data capturing with previous days Data available in above storage device.

The External Hard Drives No. NAAQBSM-2TB and NAAQBSP-2TB (2 copies) were also taken under custudy of Mr. Danesh Aravind, SE/KRDCL and security officer and kept under lock and key.

(Proceedings Prepared by N. Velayudham, Sr. SSE/KRDCL)

Encl: Annexure - I.

31.12.2019
(N. VELAYUDHAN.

1. 31/12/19
(Mr. Prasanth. S)
SE/CIVIL/KRDCL
& security officer

2. 31/12/19
(Mr. Danesh Aravind)
SE/CIVIL/KRDCL
& security offier

3.
(Mr. Sathish Sekaran)
Instrument operator)
Geokno

4.
(Mr. Karthick Palanimuthu)
Data capturing Engineer/
Geokno.

Scanned by CamScanner

ANNEXURE - I

KRDCL

S.NO	DESCRIPTION	SERIAL NUMBER	REMARKS
1	DIGICAM ✓	61-0101	AERIAL CAMERA
2	AEROCONTROL UNIT ✓	51-0118	CPU UNIT
3	SMU 2 UNIT ✓	51-0126, 51-0115	
4	CONNECT XT ✓	51-0132	
5	IMU ✓	51-0139	NAVIGATION DEVICE
6	LASER SCANNER ✓	61-0106	LIDAR SENSOR
7	LASER DATA RECORDER ✓	P/N : LAS-41-000-05133	LIDAR DATA STORAGE UNIT
8	CCNS-5 DISPLAY ✓	61-0226 (PILOT) & 13-0147 (OPERATOR)	CONTROL MONITORS
9	DIGICAM CONTROLLER DISPLAY ✓	61-0129	
10	LITEMAPPER CONTROLLER DISPLAY ✓	61-0130	
STORAGE DEVICES			
11	DIGICAM SSD	S41ANF0M502417D ✓	1 TB
12	DIGICAM SSD	S419NGAK403157Z ✓	512 GB
13	LASER LOG SSD	S1SUNSAG318963P ✓	256 GB
14	AEROCONTROL DATA CARD	QS3N116 ✓	8 GB
15	AEROCONTROL DATA CARD	QS3N109 ✓	8 GB
16	LASER SSD	61-0127, 28, 29 ✓	800 GB * 3
17	LASER SSD	71-0136, 37, 38 ✓	800 GB * 3
18	GNSS ANTENNA	463360 ✓	GPS ANTENNA

Sathish

LAPTOP FOR DATA TRANSFER	DELL LATITUDE E7470 ✓
	JWKCVF2 ✓

EXTERNAL HARD DRIVES		
S.NO.	SERIAL NUMBER	CAPACITY
1	NAAQKBV4 ✓	2 TB ✓
2	NAAQKBVE ✓	2 TB ✓
3	NAAQKBSM ✓	2 TB ✓
4	NAAQKBSP ✓	2 TB ✓
5	NAAQKMS8 ✓	2 TB ✓
6	NAAQKC2T ✓	2 TB ✓
7	NAAQKBXM ✓	2 TB ✓
8	NAAQKC2P ✓	2 TB ✓
9	NAAQ5K5Y ✓	2 TB ✓
10	NAAQHPLX ✓	2 TB ✓

1. 31/12/19.
(Mr. Prasanth .S)
SE/CIVIL/KRDCL
& Security Officer

2. 31/12/19
(Mr. Danesh Aravind)
SE/CIVIL/KRDCL
& Security Officer

3. Sarth
(Mr. Sathish Sekaran)
Instrument operator/
Geokno

4. R.Karthick
(Mr. Karthick
Palanimuthu)
Data Capturing Engineer
Geokno

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Data Security Procedings drawn on 31.12.2019 at 7.00 AM in the accommodation of Security officers/KRDCL and Geokno's Instrument opperator at Sri Devi Garden, Maruthai, near Mattanur, Kerala State to conduct Aerial LiDAR survey for the 'Thiruvananthapuram - Kasargod Semi High Speed Rail project'

Members Present :

1. Mr. Prasanth. S - Security Officer/KRDCL
2. Mr. Danesh Aravind - Security Officer/KRDCL
3. Mr. Sathish Sekaran - Instrument opperator/Geokno

Mr. Sathish Sekaran - Instrument opperator/Geokno has arrived at Mattanur @ 11.30 Hrs on 30.12.2019 with storage Devices, LapTop and Extra Hard Drives listed in the Enclosed Annexure - I in two bundles.

Above team members along with Mr. Mastan Rao, Director - (P&P)/KRDCL, Mr. N. Velayudhan, SSE/KRDCL, and Mr. Dharmendra Singh - Aircraft Maintenance Engineer/Geokn have inspected the P-68 Observer-2 VT-TAA Aircraft at Kannur Airport at about 17.00 Hrs on 30.12.2019 and found that all the seals put on 20.12.2019 during the MOD inspection on 20.12.2019 at New Delhi in the Aerial LIDAR Survey Equipments fitted in above Aircraft as Listed in the Annexure - I are in tact.

(Continued to Page-2)

1.
(Mr. Prasath. S)

2. 31/12/19
(Mr. Daneesh Aravind)

3. Sath 31/12/19
(Mr. Sathish Sekaran)

(Page - 2)

Today (31.12.2019) above team member have opend the two bundles brought by Mr. Sathish Sekaran and found that they consist of 8 Nos (Eight Numbers) of Storage Devices and 10 Nos (Ten Numbers) of External Hard Drives as listed in Annexure - I and all the seals put during MOD Inspection at New Delhi on 20.12.2019 were intact.

Mr. Sathish Sekaran / Geokno has handedover a LAPTOP for Data Transfer -- DELL LATITUDE E7470 JWKCVF2 to above Security Officers of KRDCL.

Above storage Devices were handed over to Mr. Prasanth.S SSE/CIVIL/KRDCL/Security Officer/KRDCL for Data capturing. Mr. Prasanth.S SSE/KRDCL is the Onboard Security Officer for today's Aerial LIDAR Survey and he has taken above storage Devices to Kannur Airport for Loading in to the LIDAR Survey Equipments fitted in the Aircraft.

Above team members handedover the External Hard Drives vide Sl. No. 1 to 10 of Annexure - I to Mr. N. Velayudhan, SSE / KRDCL in sealed condition for safecustody and to utilise for Data transfer from storage Devices on daily basis till completion of Data capturing.

(Proceedings Prepared by
N. VELAYUDHAN / SSE, KRDCL)
31.12.2019.

Encl: Annexure - I.

1.
(Mr. Prasanth. S)
SSE / CIVIL / KRDCL

2. 31/12/19
(Mr. Daneesh Aravind)
SSE / CIVIL / KRDCL

3. 31/12/19
(Mr. Sathish Sekaran)
Instrument opperator /
Geokno.

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ANNEXURE - I

KRDCL

S.NO	DESCRIPTION	SERIAL NUMBER	REMARKS
1	DIGICAM	61-0101	AERIAL CAMERA
2	AEROCONTROL UNIT	51-0118	CPU UNIT
3	SMU 2 UNIT	51-0126, 51-0115	
4	CONNECT XT	51-0132	
5	IMU	51-0139	NAVIGATION DEVICE
6	LASER SCANNER	61-0106	LIDAR SENSOR
7	LASER DATA RECORDER	P/N : LAS-41-000-05133	LIDAR DATA STORAGE UNIT
8	CCNS-5 DISPLAY	61-0226 (PILOT) & 13-0147 (OPERATOR)	CONTROL MONITORS
9	DIGICAM CONTROLLER DISPLAY	61-0129	
10	LITEMAPPER CONTROLLER DISPLAY	61-0130	
STORAGE DEVICES			
11	DIGICAM SSD	S41ANF0M502417D	1 TB
12	DIGICAM SSD	S419NGAK403157Z	512 GB
13	LASER LOG SSD	S1SUNSAG318963P	256 GB
14	AEROCONTROL DATA CARD	QS3N116	8 GB
15	AEROCONTROL DATA CARD	QS3N109	8 GB
16	LASER SSD	61-0127, 28, 29	800 GB * 3
17	LASER SSD	71-0136, 37, 38	800 GB * 3
18	GNSS ANTENNA	463360	GPS ANTENNA

US

Sathish

LAPTOP FOR DATA TRANSFER	DELL LATITUDE E7470
	JWKCVF2

EXTERNAL HARD DRIVES		
S.NO	SERIAL NUMBER	CAPACITY
1	NAAQKBV4	2 TB
2	NAAQKBVE	2 TB
3	NAAQKBSM	2 TB
4	NAAQKBSP	2 TB
5	NAAQKMS8	2 TB
6	NAAQKC2T	2 TB
7	NAAQKBXM	2 TB
8	NAAQKC2P	2 TB
9	NAAQ5K5Y	2 TB
10	NAAQHPLX	2 TB

1\.
(Mr. Prasanth. S)
SE/CIVIL, KRDCL

2. 31/12/19
(Mr. Danesh Aravind)
SE/CIVIL, KRDCL

3. Sathish 31/12/19
(Mr. Sathish Selcaran)
Instrument operator
Geokno

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DATA SUBMISSION FORM

"AERIAL LiDAR SURVEY FOR THIRUVANANTHAPURAM – KASARAGOD SEMI-HIGH-SPEED RAIL CORRIDOR"

AERIAL DATA CAPTURE COMPLETION & SUBMISSION FORM

06-01-2020

The approved 10 external hard drives were handed over to KRDCL security officers on **30-12-2019** and were used to store the captured data of the respective project from **31-12-2019 to 05-01-2020** as per below table. The below external hard drives were in security officer custody at all times from **30-12-2019**.

Date	HDD Number	Serial Number	Size Utilized
31-12-2019	KRDCL-01	NAAQKBSM	845 gb/1.81 tb
31-12-2019	KRDCL-01A	NAAQKBSP	847 gb/1.81 tb
01-01-2020	KRDCL-02	NAAQKC2T	1.57 tb/1.81 tb
01-01-2020	KRDCL-02A	NAAQKBXM	1.57 tb/1.81 tb
02-01-2020	KRDCL-02	NAAQKC2T	1.57 tb/1.81 tb
02-01-2020	KRDCL-02A	NAAQKBXM	1.57 tb/1.81 tb
03-01-2020	KRDCL-03	NAAQHPLX	882 gb/1.81 tb
03-01-2020	KRDCL-03A	NAAQKBVE	882 gb/1.81 tb
04-01-2020	KRDCL-04	NAAQKBV4	1.06 tb/1.81 tb
04-01-2020	KRDCL-04A	NAAQ5K5Y	1.06 tb/1.81 tb
05-01-2020	KRDCL-05	NAAQKC2P	0.98 tb/1.81 tb
05-01-2020	KRDCL-05A	NAAQKMS8	0.98 tb/1.81 tb

These Hard disk contains Raw Laser data, Raw photos, Raw INS data and supporting files. The data in the capturing hard drive (Litemapper Storage Devices – attached as annexure) has been deleted and checked by the security officer. These are the only 2 sets of raw data for 5 days available and we don't have any copy of the respective data. The above hard drives were handed over on daily basis after data transferring to KRDCL security officer.

06/01/2020
Accepted by SE/KRDCL
by

LA RAIL DEVELOPMENT CORPORATION LIMITED
CIN U63030KL2017SGC047699

06/01/2020.
PM/GIPL
Handed Over
06/01/2020

Scanned by CamScanner

Annexure - 1

Litemapper Storage Devices

	Storage Device	Serial Number	Capacity
1	DIGICAM SSD	S41ANF0M502417D	1 TB
2	DIGICAM SSD	S419NGAK403157Z	512 GB
3	LASER LOG SSD	S1SUNSAG318963P	256 GB
4	AEROCONTROL DATA CARD	QS3N116	8 GB
5	AEROCONTROL DATA CARD	QS3N109	8 GB
6	LASER SSD	61-0127, 28, 29	800 GB * 3
7	LASER SSD	71-0136, 37, 38	800 GB * 3

06/01/2020
PM/GIPL

Hyderabad

CIN U63030KL2017SGC047699

P. Raja
06/01/2020

06/01/2020
GE/KRDCL

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SPATIAL ACCURACY TABLE

Ground Control Points and Observed LiDAR test points Comparison

S.No	Point ID	Ground Control Points / Features from DGPS Survey			Observed Test Points (LiDAR)			Difference (m)			RMSE			
		Easting (E)	Northing (N)	Elevation (H)	Easting (E)	Northing (N)	Elevation (H)	Dx	Dy	Dz	(Diff in x)^2	(Diff in y)^2	(Diff in z)^2	(Diff in x)^2+ (Diff in y)^2
		meters	meters	meters	meters	meters	meters	meters	meters	meters	meters	meters	meters	meters
1	KRDCL-002-SCP	709408.815	940995.198	3.535	709408.781	940995.170	3.525	0.034	0.028	0.010	0.001	0.001	0.000	0.002
2	KRDCL-003-SCP/TCP	706363.127	944780.598	6.023	706363.126	944780.604	5.980	0.001	-0.006	0.043	0.000	0.000	0.002	0.000
3	KRDCL-004-SCP	704032.694	949805.752	10.125	704032.681	949805.735	10.091	0.013	0.017	0.034	0.000	0.000	0.001	0.000
4	KRDCL-005-SCP	701070.033	953163.024	7.007	701070.025	953163.013	6.984	0.008	0.011	0.023	0.000	0.000	0.001	0.000
5	KRDCL-006-SCP	698524.067	958032.336	12.414	698524.093	958032.339	12.384	-0.026	-0.003	0.030	0.001	0.000	0.001	0.001
6	KRDCL-007-SCP/TCP	698301.716	964253.248	36.087	698301.715	964253.242	36.112	0.001	0.006	-0.025	0.000	0.000	0.001	0.000
7	KRDCL-008-SCP	698757.153	969675.042	53.540	698757.197	969675.059	53.510	-0.044	-0.017	0.030	0.002	0.000	0.001	0.002
8	KRDCL-009-SCP	697968.699	972567.975	93.020	697968.711	972567.939	93.015	-0.012	0.036	0.005	0.000	0.001	0.000	0.001
9	KRDCL-010-SCP	695617.209	976427.145	43.584	695617.212	976427.145	43.568	-0.003	0.000	0.016	0.000	0.000	0.000	0.000
10	KRDCL-011-SCP	690724.603	978350.275	52.211	690724.631	978350.280	52.213	-0.028	-0.005	-0.002	0.001	0.000	0.000	0.001
11	KRDCL-012-SCP	685487.274	980254.015	6.447	685487.235	980254.025	6.444	0.039	-0.010	0.003	0.002	0.000	0.000	0.002
12	KRDCL-013-SCP/TCP	682028.403	984049.057	4.536	682028.360	984049.058	4.513	0.043	-0.001	0.023	0.002	0.000	0.001	0.002
13	KRDCL-014-SCP	683321.608	988575.783	15.586	683321.608	988575.798	15.574	0.000	-0.015	0.012	0.000	0.000	0.000	0.000
14	KRDCL-015-SCP	685245.959	992326.302	37.757	685245.959	992326.294	37.754	0.000	0.008	0.003	0.000	0.000	0.000	0.000
15	KRDCL-016-SCP	684572.246	997523.803	28.502	684572.261	997523.812	28.498	-0.015	-0.009	0.004	0.000	0.000	0.000	0.000
16	KRDCL-017-SCP	683888.702	1002182.885	33.862	683888.692	1002182.870	33.833	0.010	0.015	0.029	0.000	0.000	0.001	0.000
17	KRDCL-018-SCP/TCP	683930.082	1005707.328	14.605	683930.103	1005707.340	14.564	-0.021	-0.012	0.041	0.000	0.000	0.002	0.001
18	KRDCL-019-SCP	681360.076	1011529.190	13.561	681360.079	1011529.181	13.551	-0.003	0.009	0.010	0.000	0.000	0.000	0.000
19	KRDCL-020-SCP	680248.236	1016615.943	18.917	680248.239	1016615.942	18.910	-0.003	0.001	0.007	0.000	0.000	0.000	0.000
20	KRDCL-021-SCP	680638.758	1021019.573	8.847	680638.764	1021019.565	8.812	-0.006	0.008	0.035	0.000	0.000	0.001	0.000
21	KRDCL-021_A-SCP	681878.731	1025999.661	15.685	681878.742	1025999.658	15.675	-0.011	0.003	0.010	0.000	0.000	0.000	0.000
22	KRDCL-022_A-SCP	679989.956	1028304.791	7.933	679989.909	1028304.733	7.869	0.047	0.058	0.064	0.002	0.003	0.004	0.006
23	KRDCL-022-SCP/TCP	680544.452	1031568.369	8.137	680544.460	1031568.338	8.146	-0.008	0.031	-0.009	0.000	0.001	0.000	0.001
24	KRDCL-023_A-SCP/TCP	679980.125	1032772.441	10.766	679980.121	1032772.464	10.724	0.004	-0.023	0.042	0.000	0.001	0.002	0.001
25	KRDCL-023-SCP	679638.278	1037537.429	6.556	679638.271	1037537.428	6.557	0.007	0.001	-0.001	0.000	0.000	0.000	0.000
26	KRDCL-024-SCP	678809.275	1043217.277	10.802	678809.282	1043217.253	10.816	-0.007	0.024	-0.014	0.000	0.001	0.000	0.001
27	KRDCL-025-SCP	678941.137	1047428.778	32.072	678941.174	1047428.653	32.217	-0.037	0.125	-0.145	0.001	0.016	0.021	0.017
28	KRDCL-026-SCP	677834.729	1044388.385	31.198	677834.685	1044388.346	31.139	0.044	0.039	0.059	0.002	0.002	0.003	0.003
29	KRDCL-026_A-SCP	677877.929	1049564.905	50.660	677877.914	1049564.941	50.623	0.015	-0.036	0.037	0.000	0.001	0.001	0.002
30	KRDCL-027-SCP	675583.912	1048377.808	29.026	675583.927	1048377.809	29.019	-0.015	-0.001	0.007	0.000	0.000	0.000	0.000
31	KRDCL-027_A-SCP	675560.902	1053288.544	15.298	675560.887	1053288.571	15.281	0.015	-0.027	0.017	0.000	0.001	0.000	0.001
32	KRDCL-028-SCP/TCP	671490.854	1053232.383	3.261	671490.847	1053232.348	3.195	0.007	0.035	0.066	0.000	0.001	0.004	0.001
33	KRDCL-028_A-SCP	674423.885	1055085.014	18.209	674423.882	1055085.023	18.149	0.003	-0.009	0.060	0.000	0.000	0.004	0.000
34	KRDCL-029-SCP	669004.022	1057045.789	19.606	669004.068	1057045.782	19.586	-0.046	0.007	0.020	0.002	0.000	0.000	0.002
35	KRDCL-029_A-SCP	672491.324	1060396.950	9.684	672491.352	1060396.931	9.637	-0.028	0.019	0.047	0.001	0.000	0.002	0.001
36	KRDCL-030-SCP	668636.019	1060322.221	27.423	668635.990	1060322.262	27.395	0.029	-0.041	0.028	0.001	0.002	0.001	0.003

37	KRDCL-030_A-SCP	671922.049	1063514.965	5.802	671922.033	1063514.965	5.722	0.016	0.000	0.080	0.000	0.000	0.006	0.000
38	KRDCL-031-SCP	671762.691	1066128.527	8.757	671762.715	1066128.532	8.707	-0.024	-0.005	0.050	0.001	0.000	0.002	0.001
39	KRDCL-032-SCP/TCP	672390.215	1069420.958	11.888	672390.246	1069420.984	11.833	-0.031	-0.026	0.055	0.001	0.001	0.003	0.002
40	KRDCL-033-SCP	670602.083	1073717.881	30.908	670602.106	1073717.861	30.832	-0.023	0.020	0.076	0.001	0.000	0.006	0.001
41	KRDCL-034-SCP	668612.127	1078832.019	29.715	668612.130	1078832.065	29.660	-0.003	-0.046	0.055	0.000	0.002	0.003	0.002
42	KRDCL-035-SCP	666213.819	1081895.747	11.205	666213.819	1081895.740	11.202	0.000	0.007	0.003	0.000	0.000	0.000	0.000
43	KRDCL-036-SCP	664665.010	1085723.439	9.177	664665.063	1085723.371	9.148	-0.053	0.068	0.029	0.003	0.005	0.001	0.007
44	KRDCL-037-SCP/TCP	662973.877	1088236.327	5.667	662973.864	1088236.347	5.591	0.013	-0.020	0.076	0.000	0.000	0.006	0.001
45	KRDCL-038-SCP	659058.664	1095475.743	12.248	659058.684	1095475.727	12.191	-0.020	0.016	0.057	0.000	0.000	0.003	0.001
46	KRDCL-039-SCP	656706.593	1096426.291	50.376	656706.567	1096426.295	50.310	0.026	-0.004	0.066	0.001	0.000	0.004	0.001
47	KRDCL-040-SCP	650910.912	1099911.005	4.449	650910.929	1099910.973	4.436	-0.017	0.032	0.013	0.000	0.001	0.000	0.001
48	KRDCL-041-SCP	650063.588	1105854.616	3.757	650063.585	1105854.604	3.681	0.003	0.012	0.076	0.000	0.000	0.006	0.000
49	KRDCL-042-SCP	651905.710	1108979.951	5.442	651905.676	1108979.958	5.371	0.034	-0.007	0.071	0.001	0.000	0.005	0.001
50	KRDCL-043-SCP/TCP	653317.410	1115575.898	26.772	653317.373	1115575.895	26.701	0.037	0.003	0.071	0.001	0.000	0.005	0.001
51	KRDCL-044-SCP	651530.386	1119526.816	8.092	651530.364	1119526.900	8.016	0.022	-0.084	0.076	0.000	0.007	0.006	0.008
52	KRDCL-045-SCP	651197.037	1123616.104	8.622	651197.093	1123616.029	8.557	-0.056	0.075	0.065	0.003	0.006	0.004	0.009
53	KRDCL-046-SCP	651046.747	1125569.290	25.180	651046.781	1125569.299	25.150	-0.034	-0.009	0.030	0.001	0.000	0.001	0.001
54	KRDCL-047-SCP	646681.356	1129642.308	13.471	646681.271	1129642.374	13.496	0.085	-0.066	-0.025	0.007	0.004	0.001	0.012
55	KRDCL-048-SCP/TCP	642872.509	1132940.658	7.759	642872.501	1132940.674	7.715	0.008	-0.016	0.044	0.000	0.000	0.002	0.000
56	KRDCL-049-SCP	641522.156	1136621.089	20.482	641522.170	1136621.043	20.432	-0.014	0.046	0.050	0.000	0.002	0.003	0.002
57	KRDCL-050-SCP	640941.917	1139662.655	22.313	640941.948	1139662.649	22.324	-0.031	0.006	-0.011	0.001	0.000	0.000	0.001
58	KRDCL-051-SCP	637802.977	1143547.638	11.685	637802.964	1143547.655	11.657	0.013	-0.017	0.028	0.000	0.000	0.001	0.000
59	KRDCL-052-SCP	635365.711	1148374.731	6.729	635365.695	1148374.746	6.706	0.016	-0.015	0.023	0.000	0.000	0.001	0.000
60	KRDCL-053-SCP/TCP	631218.460	1153167.191	6.630	631218.506	1153167.270	6.599	-0.046	-0.079	0.031	0.002	0.006	0.001	0.008
61	KRDCL-054-SCP	632256.692	1157609.687	15.740	632256.648	1157609.703	15.695	0.044	-0.016	0.045	0.002	0.000	0.002	0.002
62	KRDCL-055-SCP	632167.112	1163678.344	12.749	632167.146	1163678.348	12.750	-0.034	-0.004	-0.001	0.001	0.000	0.000	0.001
63	KRDCL-056-SCP	630480.507	1168926.027	12.564	630480.545	1168926.008	12.501	-0.038	0.019	0.063	0.001	0.000	0.004	0.002
64	KRDCL-057-SCP	628305.451	1170474.348	11.179	628305.437	1170474.324	11.115	0.014	0.024	0.064	0.000	0.001	0.004	0.001
65	KRDCL-058-SCP/TCP	623202.789	1174450.533	26.616	623202.792	1174450.501	26.576	-0.003	0.032	0.040	0.000	0.001	0.002	0.001
66	KRDCL-059-SCP	618731.455	1178432.217	15.842	618731.445	1178432.231	15.802	0.010	-0.014	0.040	0.000	0.000	0.002	0.000
67	KRDCL-060-SCP	615795.538	1182855.343	10.505	615795.537	1182855.352	10.476	0.001	-0.009	0.029	0.000	0.000	0.001	0.000
68	KRDCL-061-SCP	613845.193	1186582.922	4.982	613845.166	1186582.900	5.016	0.027	0.022	-0.034	0.001	0.000	0.001	0.001
69	KRDCL-062-SCP/TCP	611174.749	1192388.640	9.426	611174.769	1192388.633	9.360	-0.020	0.007	0.066	0.000	0.000	0.004	0.000
70	KRDCL-063-SCP	608761.069	1198713.637	9.625	608761.066	1198713.658	9.545	0.003	-0.021	0.080	0.000	0.000	0.006	0.000
71	KRDCL-064-SCP	604710.188	1203310.020	9.837	604710.123	1203309.972	9.787	0.065	0.048	0.050	0.004	0.002	0.002	0.007
72	KRDCL-065-SCP	600931.737	1206743.378	9.130	600931.717	1206743.356	9.094	0.020	0.022	0.036	0.000	0.000	0.001	0.001
73	KRDCL-066-SCP	598200.554	1210854.548	10.111	598200.550	1210854.524	10.077	0.004	0.024	0.034	0.000	0.001	0.001	0.001
74	KRDCL-067-SCP	596144.193	1213993.307	6.817	596144.252	1213993.308	6.767	-0.059	-0.001	0.050	0.003	0.000	0.002	0.003
75	KRDCL-068-SCP/TCP	595219.566	1217537.897	9.056	595219.551	1217537.904	9.053	0.015	-0.007	0.003	0.000	0.000	0.000	0.000
76	KRDCL-069-SCP	593461.912	1222615.801	8.596	593461.917	1222615.820	8.541	-0.005	-0.019	0.055	0.000	0.000	0.003	0.000
77	KRDCL-070-SCP	591663.030	1228618.773	7.565	591662.985	1228618.757	7.538	0.045	0.016	0.027	0.002	0.000	0.001	0.002
78	KRDCL-071-SCP	590304.193	1231264.839	3.266	590304.197	1231264.824	3.265	-0.004	0.015	0.001	0.000	0.000	0.000	0.000

79	KRDCL-072-SCP	590113.439	1236853.492	15.081	590113.413	1236853.563	15.078	0.026	-0.071	0.003	0.001	0.005	0.000	0.006
80	KRDCL-073-SCP	586596.465	1240460.187	9.341	586596.460	1240460.216	9.275	0.005	-0.029	0.066	0.000	0.001	0.004	0.001
81	KRDCL-074-SCP/TCP	584856.099	1244448.598	14.706	584856.079	1244448.584	14.666	0.020	0.014	0.040	0.000	0.000	0.002	0.001
82	KRDCL-075-SCP	583212.037	1248357.004	6.629	583212.022	1248356.984	6.608	0.015	0.020	0.021	0.000	0.000	0.000	0.001
83	KRDCL-076-SCP	580859.307	1254189.851	4.437	580859.285	1254189.842	4.434	0.022	0.009	0.003	0.000	0.000	0.000	0.001
84	KRDCL-077-SCP	579765.617	1258573.585	3.734	579765.604	1258573.553	3.661	0.013	0.032	0.073	0.000	0.001	0.005	0.001
85	KRDCL-078-SCP/TCP	577251.774	1263043.785	17.049	577251.742	1263043.769	16.984	0.032	0.016	0.065	0.001	0.000	0.004	0.001
86	KRDCL-079-SCP	574542.550	1266572.292	6.925	574542.534	1266572.309	6.891	0.016	-0.017	0.034	0.000	0.000	0.001	0.001
87	KRDCL-080-SCP	570115.675	1271018.980	2.098	570115.689	1271018.994	2.092	-0.014	-0.014	0.006	0.000	0.000	0.000	0.000
88	KRDCL-081-SCP	568793.176	1273660.729	10.821	568793.238	1273660.652	10.756	-0.062	0.077	0.065	0.004	0.006	0.004	0.010
89	KRDCL-082-SCP	567810.381	1280974.394	11.379	567810.322	1280974.374	11.326	0.059	0.020	0.053	0.003	0.000	0.003	0.004
90	KRDCL-083-SCP/TCP	566295.546	1283338.423	5.684	566295.542	1283338.434	5.649	0.004	-0.011	0.035	0.000	0.000	0.001	0.000
91	KRDCL-084-SCP	562724.058	1287620.115	8.268	562724.077	1287620.129	8.251	-0.019	-0.014	0.017	0.000	0.000	0.000	0.001
92	KRDCL-085-SCP	560439.073	1290970.712	7.726	560439.068	1290970.674	7.725	0.005	0.038	0.001	0.000	0.001	0.000	0.001
93	KRDCL-086-SCP	559313.317	1296973.908	18.185	559313.273	1296973.989	18.107	0.044	-0.081	0.078	0.002	0.007	0.006	0.008
94	KRDCL-087-SCP	557791.445	1302566.088	13.778	557791.435	1302566.083	13.708	0.010	0.005	0.070	0.000	0.000	0.005	0.000
95	KRDCL-088-SCP/TCP	555759.055	1305571.848	10.916	555759.005	1305571.932	10.867	0.050	-0.084	0.049	0.003	0.007	0.002	0.010
96	KRDCL-089-SCP	551658.509	1307355.533	22.310	551658.498	1307355.535	22.275	0.011	-0.002	0.035	0.000	0.000	0.001	0.000
97	KRDCL-090-SCP	546684.059	1309507.037	6.557	546684.037	1309507.018	6.509	0.022	0.019	0.048	0.000	0.000	0.002	0.001
98	KRDCL-091-SCP	544367.611	1311734.752	4.976	544367.626	1311734.742	4.932	-0.015	0.010	0.044	0.000	0.000	0.002	0.000
99	KRDCL-092-SCP	539711.744	1312829.465	9.498	539711.734	1312829.461	9.490	0.010	0.004	0.008	0.000	0.000	0.000	0.000
100	KRDCL-093-SCP	537794.401	1318621.351	3.221	537794.435	1318621.361	3.152	-0.034	-0.010	0.069	0.001	0.000	0.005	0.001
101	KRDCL-094-SCP	534596.121	1324398.872	5.112	534596.147	1324398.864	5.084	-0.026	0.008	0.028	0.001	0.000	0.001	0.001
102	KRDCL-095-SCP/TCP	531666.383	1326417.565	2.279	531666.400	1326417.552	2.216	-0.017	0.013	0.063	0.000	0.000	0.004	0.000
103	KRDCL-096-SCP	528935.378	1329765.207	8.088	528935.402	1329765.193	8.042	-0.024	0.014	0.046	0.001	0.000	0.002	0.001
104	KRDCL-097-SCP	525813.085	1333670.793	3.832	525813.106	1333670.834	3.766	-0.021	-0.041	0.066	0.000	0.002	0.004	0.002
105	KRDCL-098-SCP	521033.705	1337286.970	3.801	521033.705	1337286.961	3.795	0.000	0.009	0.006	0.000	0.000	0.000	0.000
106	KRDCL-099-SCP	519472.682	1340816.796	5.936	519472.686	1340816.798	5.906	-0.004	-0.002	0.030	0.000	0.000	0.001	0.000
107	KRDCL-100-SCP	519064.797	1345656.243	7.159	519064.805	1345656.210	7.102	-0.008	0.033	0.057	0.000	0.001	0.003	0.001
108	KRDCL-101-SCP/TCP	516996.437	1349906.592	4.381	516996.440	1349906.595	4.355	-0.003	-0.003	0.026	0.000	0.000	0.001	0.000
109	KRDCL-102-SCP	514888.309	1354728.323	11.168	514888.285	1354728.353	11.138	0.024	-0.030	0.030	0.001	0.001	0.001	0.001
110	KRDCL-103-SCP	512210.656	1356518.263	15.633	512210.666	1356518.252	15.570	-0.010	0.011	0.063	0.000	0.000	0.004	0.000
111	KRDCL-104-SCP	509067.700	1362334.178	6.689	509067.705	1362334.169	6.688	-0.005	0.009	0.001	0.000	0.000	0.000	0.000
112	KRDCL-105-SCP	506614.211	1366964.183	12.111	506614.213	1366964.184	12.077	-0.002	-0.001	0.034	0.000	0.000	0.001	0.000
113	KRDCL-106-SCP/TCP	503595.769	1370835.577	17.717	503595.769	1370835.602	17.662	0.000	-0.025	0.055	0.000	0.001	0.003	0.001
114	KRDCL-107-SCP	502587.160	1374609.228	20.199	502587.206	1374609.222	20.141	-0.046	0.006	0.058	0.002	0.000	0.003	0.002
115	KRDCL-108-SCP	499550.910	1379244.504	2.379	499550.867	1379244.580	2.382	0.043	-0.076	-0.003	0.002	0.006	0.000	0.008
											SUM		0.239	0.202
											Average		0.002	0.002
											RMSE		0.046	0.042

Horizontal Accuracy as per NSSDA Format (1.96 times of RMSE)		0.082
Vertical Accuracy as per NSSDA Format (1.96 times of RMSE)	0.089	

NSSDA Horizontal Accuracyr (ACCr) at 95% Confidence Level (1.96 times of RMSE value) (m)	0.082	Achieved Accuracy
NSSDA Vertical Accuracyz (ACCz) at 95% Confidence Level (1.96 times of RMSE value) (m)	0.089	
Horizontal Accuracy (ACCr) at 95% Confidence Level (1.96 times of RMSE value) (m)	0.100	Required Accuracy
Vertical Accuracyz (ACCz) at 95% Confidence Level (1.96 times of RMSE value) (m)	0.100	

POST SECURITY VETTING LETTER

स्वच्छ भारत
एक कदम स्वच्छता की ओर

SPEED POST/EMAIL

निदेशालय, सर्वेक्षण (हवाई) एवं
दिल्ली भू-स्थानिक ऑकड़ा केन्द्र का कार्यालय
द्वितीय तल, विंग 4, पश्चिमी खंड संख्या 4,
रामाकृष्णा पुरम, नई दिल्ली - 110066
दूरभाष-26107795, 26108392,
फैक्स न, 26196301

भारत सरकार
GOVERNMENT OF INDIA
विज्ञान एवं प्रौद्योगिकी मंत्रालय
Ministry of Science & Technology
भारतीय सर्वेक्षण विभाग
SURVEY OF INDIA

DIRECTORATE OF SURVEY (AIR)
& DELHI GEO-SPATIAL DATA CENTRE
2ND FLOOR, WING IV, WEST BLOCK NO. 4,
R. K. Puram, NEW DELHI - 110 066
Tel.No.26107795,26108392,
Fax No. : 26196301
E-mail: delhi.gdc.soi@gov.in

SECRET

No.T-476/51-E (Final Class.)

Dated -11-05- 2020.

To

Sh.V Ajith Kumar,
Managing Director,
Kerala Rail Development Corporation Ltd
Trans Tower,5th Floor,Vahuthacaud
Thiruvananthapuram,Kerala-695014

SUB:- FINAL CLASSIFICATION OF AERIAL LIDAR DATA OF TASK NO. 1872 – D/ THIRUVANANTHAPURAM - KASARAGOD SEMI-HIGH SPEED RAIL CORRIDOR - REG.

Ref.:- Your office letter No. **KRDCL/243/**2019 dated **11- 11**-2019.

With reference to the letter cited above, the Final Classification of Aerial LiDAR Data of **Spec. No. 1872 – D/Thiruvananthapuram-Kasaragod Semi-High Speed Rail Corridor** is being submitted herewith vide enclosed Annexures 'A' for information & necessary action at your end please.

16 Nos. of hard copies marked VAs/VPs by security vetting agencies are also being sent for your reference.

Note:- All out side of the permitted area(as permitted area marked on cover plots) i.e out side of the AOI must be deleted /blackened out from the Database (from Raw Data & Processed data), due to extra area coverage, before the final classification.

It is intimated that the above classified images/data may be issued to the indenter for bona fide purpose, as procedure in vouge.

A certificate regarding Note may be submitted to this office for onward submission to Ministry of Defence.

(D.N. PATHAK)
Director.

Encl.:- As above.

Copy to:-
- i) The Surveyor General of India, Dehra Dun for information please.
- ii) The Addl SG, Specialized Zone, Dehra Dun for information please.
- iii) Ministry of Defence, D(GS-III), South Block, Room No. 203, New Delhi for information.
- iv) The Mil Svy GSGS/Air Int/Nav.Int./MI-17/IB(MHA) for information with copy of enclosure.
- v) CC (Tech)

ANNEXURE 'A'

FINAL CLASSIFICATION OF AERIAL LIDAR DATA OF TASK NO.1872 – D/ THIRUVANANTHAPURAM-KASARAGOD SEMI-HIGH SPEED RAIL CORRIDOR

SL.NO.	TOPO SHEET	TILE NO.	CLASSIFI- -CATION	REMARKS
1	58D/14	70609430, 70609440	SECRET	AFTER DELETION/BLACKENING OUT OF THE MARKED VA'S/VP'S, CLASSIFICATION MAY BE DOWNGRADED TO RESTRICTED
2	58D/14	70609440	SECRET	AFTER DELETION/BLACKENING OUT OF THE MARKED VA'S/VP'S, CLASSIFICATION MAY BE DOWNGRADED TO RESTRICTED
3	58B/8	65101122, 65101123	SECRET	AFTER DELETION/BLACKENING OUT OF THE MARKED VA'S/VP'S, CLASSIFICATION MAY BE DOWNGRADED TO RESTRICTED
4	58D/9	68309900, 68409900	SECRET	AFTER DELETION/BLACKENING OUT OF THE MARKED VA'S/VP'S, CLASSIFICATION MAY BE DOWNGRADED TO RESTRICTED
5	58C/5	64901102, 64901103	SECRET	AFTER DELETION/BLACKENING OUT OF THE MARKED VA'S/VP'S, CLASSIFICATION MAY BE DOWNGRADED TO RESTRICTED
6	58B/8	64801104	SECRET	AFTER DELETION/BLACKENING OUT OF THE MARKED VA'S/VP'S, CLASSIFICATION MAY BE DOWNGRADED TO RESTRICTED
7	58B/8	64201134	SECRET	AFTER DELETION/BLACKENING OUT OF THE MARKED VA'S/VP'S, CLASSIFICATION MAY BE DOWNGRADED TO RESTRICTED
8	49N/13	60001206	SECRET	AFTER DELETION/BLACKENING OUT OF THE MARKED VA'S/VP'S, CLASSIFICATION MAY BE DOWNGRADED TO RESTRICTED
9	49N/13	59901208	SECRET	AFTER DELETION/BLACKENING OUT OF THE MARKED VA'S/VP'S, CLASSIFICATION MAY BE DOWNGRADED TO RESTRICTED
10	49M/16	58701238, 58801238	SECRET	AFTER DELETION/BLACKENING OUT OF THE MARKED VA'S/VP'S, CLASSIFICATION MAY BE DOWNGRADED TO RESTRICTED
11	49M/15	58301247	SECRET	AFTER DELETION/BLACKENING OUT OF THE MARKED VA'S/VP'S, CLASSIFICATION MAY BE DOWNGRADED TO RESTRICTED
12	49M/11	58001253, 58001254	SECRET	AFTER DELETION/BLACKENING OUT OF THE MARKED VA'S/VP'S, CLASSIFICATION MAY BE DOWNGRADED TO RESTRICTED
13	49M/11	58001254	SECRET	AFTER DELETION/BLACKENING OUT OF THE MARKED VA'S/VP'S, CLASSIFICATION MAY BE DOWNGRADED TO RESTRICTED

14	49M/10	55901296	SECRET	AFTER DELETION/BLACKENING OUT OF THE MARKED VA'S/VP'S, CLASSIFICATION MAY BE DOWNGRADED TO RESTRICTED
15	48P/4	51601350, 51601349	SECRET	AFTER DELETION/BLACKENING OUT OF THE MARKED VA'S/VP'S, CLASSIFICATION MAY BE DOWNGRADED TO RESTRICTED
16	58D/14	70609440, 70509440	SECRET	AFTER DELETION/BLACKENING OUT OF THE MARKED VA'S/VP'S, CLASSIFICATION MAY BE DOWNGRADED TO RESTRICTED

Rest of the Aerial Photo Tiles of aerial LiDAR photography pertaining to this task are classified as "RESTRICTED".

Note:-

1. All marked VAs/VPs must be deleted from the product in the proof stage onward before issuing to any office other than SOI. A certificate in this regard may be submitted to this office for onward submission to Ministry of Defence.
2. All the marked VAs/VPs have been checked on respective aerial photoTiles.
3. The above classified aerial photography/ Tiles data may be issued for bona fide purpose, as per the procedure in vouge.

05/05/2020

Complied by : (G.S. Walia),Surveyor

5/05/2020

Checked by : (Virendra Singh), O.S.

DETAIL/LIST OF ROAD CROSSINGS

Sl.No	Chainage	Road Name	Width of Road (in metres)	Width of Divider (in metres)
1	-0+508	Metalled Road	5.244	NA
2	-0+662	Metalled Road	6.014	NA
3	2+101	Veli - Perumathura Rd	4.060	NA
4	2+248	Metalled Road	4.156	NA
5	2+418	Metalled Road	4.095	NA
6	2+879	Veli - Perumathura Rd	1.703	NA
7	3+208	Metalled Road	1.690	NA
8	3+277	Metalled Road	1.557	NA
9	3+345	Metalled Road	1.692	NA
10	3+372	Metalled Road	1.847	NA
11	3+519	Metalled Road	3.948	NA
12	3+596	Metalled Road	2.044	NA
13	3+690	Trivandrum Bypass Road	2.420	NA
14	3+811	Metalled Road	1.623	NA
15	3+898	Metalled Road	1.374	NA
16	4+061	Metalled Road	0.825	NA
17	4+117	Metalled Road	2.409	NA
18	4+216	Metalled Road	2.834	NA
19	4+234	Metalled Road	2.824	NA
20	4+332	Veli - Perumathura Rd	5.615	NA
21	4+780	Sreekariyam Kulathoor Rd	2.442	NA
22	4+783	Metalled Road	2.668	NA
23	5+123	Attinkuzhy Rd	3.076	NA
24	6+031	Metalled Road	4.646	NA
25	6+075	Kazhakuttom Railway Station Rd	4.638	NA
26	6+233	Kazhakoottam-Kulathur Rd	1.753	NA
27	6+435	High School Rd	3.484	NA
28	6+682	Metalled Road	1.255	NA
29	6+759	Metalled Road	1.793	NA
30	6+925	Metalled Road	2.467	NA
31	7+214	Kazhakuttam Menamkulam Rd	6.399	NA
32	7+270	Metalled Road	2.002	NA
33	7+283	Metalled Road	3.420	NA
34	8+212	Metalled Road	2.833	NA
35	8+880	St Andrews Rd	4.920	NA
36	10+027	Chirayinkeezhu Kaniyapuram Rd	4.641	NA
37	11+275	Metalled Road	2.368	NA
38	11+530	Chirayinkeezhu Kaniyapuram Rd	3.223	NA
39	11+849	Metalled Road	2.368	NA
40	11+968	Karichara kadavu Rd	4.051	NA
41	12+397	Metalled Road	2.420	NA
42	12+783	Edavilakom Rd	2.700	NA

43	13+464	Chirayinkeezhu Kaniyapuram Rd	4.400	NA
44	15+214	Metalled Road	2.100	NA
45	15+232	Metalled Road	3.037	NA
46	15+440	Nalumukku Moonnumukku Rd	1.437	NA
47	15+496	Metalled Road	3.292	NA
48	15+721	Metalled Road	2.804	NA
49	15+841	Metalled Road	2.500	NA
50	15+971	Metalled Road	3.434	NA
51	16+105	Chirayinkeezhu Kaniyapuram Rd	5.689	NA
52	16+258	Metalled Road	3.143	NA
53	16+388	Akkaravila Rd	3.260	NA
54	16+519	Perunguzhi Moonnumukku Road	3.787	NA
55	16+763	Metalled Road	3.440	NA
56	17+057	Metalled Road	2.912	NA
57	17+179	Perunguzhi Moonnumukku Road	3.680	NA
58	17+878	Metalled Road	5.423	NA
59	18+605	Manjadimoodu Muttappalam Rd	3.813	NA
60	19+367	Metalled Road	2.219	NA
61	19+443	Metalled Road	2.420	NA
62	19+704	Chirayinkeezhu - Korani Rd	5.752	NA
63	20+037	Metalled Road	3.311	NA
64	20+245	Metalled Road	2.688	NA
65	20+466	Metalled Road	2.011	NA
66	20+584	Metalled Road	2.074	NA
67	20+732	Metalled Road	2.438	NA
68	21+529	Metalled Road	2.694	NA
69	21+559	Metalled Road	7.178	NA
70	21+882	Metalled Road	2.055	NA
71	22+012	Metalled Road	2.689	NA
72	22+799	Metalled Road	1.956	NA
73	22+867	Metalled Road	2.091	NA
74	22+910	Metalled Road	6.691	NA
75	23+226	Metalled Road	3.057	NA
76	23+302	Metalled Road	4.085	NA
77	23+804	Metalled Road	2.849	NA
78	24+138	Metalled Road	3.250	NA
79	24+236	Metalled Road	1.996	NA
80	24+594	Metalled Road	2.513	NA
81	24+848	Metalled Road	2.297	NA
82	24+876	Metalled Road	1.618	NA
83	24+958	Metalled Road	1.618	NA
84	25+217	Metalled Road	3.685	NA
85	25+466	Metalled Road	2.341	NA
86	25+850	Metalled Road	2.508	NA

87	26+014	Metalled Road	2.389	NA
88	26+091	Metalled Road	1.731	NA
89	26+136	Metalled Road	1.841	NA
90	26+379	Metalled Road	6.393	NA
91	26+550	Metalled Road	2.826	NA
92	26+774	Metalled Road	2.286	NA
93	27+802	Metalled Road	3.171	NA
94	28+113	Metalled Road	2.500	NA
95	28+509	Metalled Road	6.000	NA
96	28+536	Metalled Road	10.000	NA
97	29+543	Metalled Road	3.046	NA
98	29+900	Metalled Road	3.017	NA
99	30+107	Metalled Road	3.007	NA
100	30+528	Metalled Road	3.005	NA
101	30+900	Metalled Road	2.800	NA
102	31+252	Metalled Road	2.400	NA
103	31+865	Metalled Road	5.800	NA
104	32+350	Metalled Road	2.518	NA
105	32+592	Metalled Road	3.302	NA
106	32+926	Metalled Road	2.370	NA
107	33+007	Metalled Road	2.975	NA
108	33+429	Metalled Road	2.344	NA
109	33+932	Metalled Road	4.948	NA
110	34+228	Metalled Road	4.800	NA
111	34+940	Metalled Road	7.946	NA
112	35+817	Metalled Road	2.205	NA
113	36+592	Metalled Road	2.000	NA
114	36+616	Metalled Road	3.358	NA
115	37+063	Metalled Road	7.500	NA
116	38+347	Metalled Road	2.700	NA
117	38+970	Metalled Road	2.700	NA
118	39+231	Metalled Road	5.800	NA
119	39+535	Metalled Road	3.800	NA
120	39+600	Metalled Road	2.290	NA
121	39+832	Metalled Road	2.400	NA
122	39+925	Metalled Road	2.400	NA
123	40+139	Metalled Road	2.600	NA
124	40+428	Metalled Road	2.749	NA
125	40+493	Metalled Road	2.270	NA
126	40+893	Metalled Road	3.394	NA
127	41+713	Metalled Road	2.296	NA
128	41+964	Metalled Road	2.655	NA
129	41+994	Vilavoorkonam-Kalluvathukkal Rd	5.580	NA
130	42+363	Metalled Road	2.806	NA

131	42+794	Metalled Road	2.599	NA
132	42+906	Nadakkal-Kalluvathukkal Rd 22	5.461	NA
133	43+037	Metalled Road	2.715	NA
134	43+331	Metalled Road	2.745	NA
135	43+835	Metalled Road	2.419	NA
136	44+017	Metalled Road	3.292	NA
137	44+221	Metalled Road	3.280	NA
138	44+398	Metalled Road	2.401	NA
139	44+781	Salem - Kochi - Kanyakumari Hwy	10.092	NA
140	45+061	Kannetta Rd	3.010	NA
141	45+562	Metalled Road	3.904	NA
142	45+758	Chintex Rd	3.764	NA
143	46+166	Chathannoor - Chirakkala Rd	3.449	NA
144	46+435	College Rd	2.145	NA
145	46+793	Chathannoor - Chirakkala Rd	5.203	NA
146	46+854	Metalled Road	2.252	NA
147	47+243	Bhadrasadanam Ln	4.467	NA
148	47+500	Metalled Road	2.113	NA
149	47+662	Panayil Rd	2.797	NA
150	47+754	Metalled Road	2.736	NA
151	47+904	Metalled Road	2.509	NA
152	48+005	Metalled Road	3.464	NA
153	48+434	Metalled Road	4.595	NA
154	48+537	Standard Junction Paalamood Rd	7.273	NA
155	49+142	Metalled Road	2.359	NA
156	49+162	Kanjiramkadavu - Ithikkara Rd	2.328	NA
157	49+433	Metalled Road	3.478	NA
158	49+909	Metalled Road	2.418	NA
159	50+048	Pattathil Rd	3.231	NA
160	50+252	Metalled Road	2.752	NA
161	50+441	Salem - Kochi - Kanyakumari Hwy	10.248	NA
162	50+559	Metalled Road	3.282	NA
163	50+664	Metalled Road	3.250	NA
164	50+713	Metalled Road	2.669	NA
165	50+890	Metalled Road	2.917	NA
166	51+766	Metalled Road	2.828	NA
167	51+877	Metalled Road	2.050	NA
168	52+300	Kottiyam - Kundara Rd	2.551	NA
169	52+483	Metalled Road	2.772	NA
170	52+672	Kottiyam - Kundara Rd	8.334	NA
171	53+369	Metalled Road	3.284	NA
172	53+748	Metalled Road	3.680	NA
173	54+399	Metalled Road	5.140	NA
174	55+846	Kollam-Ayoor Rd	5.505	NA

175	56+289	Metalled Road	4.438	NA
176	56+969	Metalled Road	4.910	NA
177	57+032	Metalled Road	2.364	NA
178	58+220	Sarathy-Moideen Jct Rd	3.944	NA
179	58+994	Metalled Road	2.878	NA
180	59+313	Metalled Road	2.265	NA
181	59+598	Metalled Road	2.659	NA
182	59+622	Metalled Road	2.659	NA
183	59+785	Metalled Road	5.463	NA
184	60+606	Kundara Rd	5.351	NA
185	61+716	Metalled Road	3.797	NA
186	61+845	Metalled Road	2.542	NA
187	61+935	Metalled Road	2.332	NA
188	62+032	Metalled Road	2.498	NA
189	62+546	Kottiyam - Kundara Rd	6.657	NA
190	62+909	Metalled Road	2.785	NA
191	63+018	Mukkada Rd	8.761	NA
192	63+080	Metalled Road	1.789	NA
193	63+321	Metalled Road	3.280	NA
194	63+450	Metalled Road	2.657	NA
195	63+745	Metalled Road	2.199	NA
196	63+913	Metalled Road	3.069	NA
197	64+153	Metalled Road	2.177	NA
198	64+390	Metalled Road	5.274	NA
199	64+623	Metalled Road	3.016	NA
200	64+747	Metalled Road	2.988	NA
201	64+964	Kundara - Chittumala Rd	4.410	NA
202	65+518	Metalled Road	3.812	NA
203	65+624	Metalled Road	3.329	NA
204	65+651	Metalled Road	2.172	NA
205	65+963	Metalled Road	3.039	NA
206	66+156	Metalled Road	4.109	NA
207	66+253	Metalled Road	4.112	NA
208	66+379	Metalled Road	2.805	NA
209	66+579	Metalled Road	2.698	NA
210	66+723	Metalled Road	5.021	NA
211	66+806	Mulavana-Plakkad Colony Rd	3.108	NA
212	66+921	Metalled Road	2.322	NA
213	67+083	Mulavana-Plakkad Colony Rd	3.611	NA
214	68+355	Metalled Road	2.135	NA
215	68+569	Mulavana - Kaithacode Rd	2.627	NA
216	69+342	Kozhikkodanmukku-Kallada Rd	2.719	NA
217	70+024	Kozhikkodanmukku-Kallada Rd	5.450	NA
218	70+382	Metalled Road	2.267	NA

219	70+727	Metalled Road	3.155	NA
220	71+130	Metalled Road	2.611	NA
221	71+223	Kattuvilla Devi Temple Rd	1.668	NA
222	71+296	Metalled Road	3.722	NA
223	71+944	Metalled Road	3.175	NA
224	72+348	Aattukadavu-Thuruthikkara Rd	2.818	NA
225	72+974	Metalled Road	4.491	NA
226	73+656	Metalled Road	2.887	NA
227	73+749	Metalled Road	6.504	NA
228	74+000	Metalled Road	5.604	NA
229	74+467	Metalled Road	2.714	NA
230	74+805	Kottarakkara Sasthamcotta Rd	6.979	NA
231	75+003	Metalled Road	2.607	NA
232	75+246	Metalled Road	2.372	NA
233	75+336	Metalled Road	2.407	NA
234	75+513	Metalled Road	2.391	NA
235	75+688	Metalled Road	2.986	NA
236	76+366	Ezham Mile - Nediyavila Road	4.833	NA
237	77+041	Adoor - Kollam Rd	6.569	NA
238	77+304	Panchayat Rd	2.278	NA
239	77+398	Metalled Road	2.389	NA
240	77+615	Metalled Road	2.509	NA
241	77+668	Metalled Road	2.800	NA
242	78+293	Edakkad Road	3.920	NA
243	78+482	Metalled Road	3.068	NA
244	79+061	Metalled Road	3.619	NA
245	79+599	Metalled Road	2.771	NA
246	79+722	Kallukuzhi - Malanada Temple Rd	2.968	NA
247	80+082	Metalled Road	2.356	NA
248	80+374	Ganeshavilasam - Edakkad Rd	3.770	NA
249	80+698	Metalled Road	2.791	NA
250	80+750	Metalled Road	4.313	NA
251	81+171	Thengamam - Ganeshavilasam Rd	3.244	NA
252	81+874	Nellimukal - Thengamam	4.403	NA
253	82+177	Metalled Road	2.400	NA
254	82+497	Thengamam - Kaithackal - Anayad	3.305	NA
255	82+646	Metalled Road	3.068	NA
256	82+899	Thottammukku - Kollaickal Rd	5.048	NA
257	83+702	Metalled Road	3.168	NA
258	84+283	Pazhakulam - Anayadi Rd	5.853	NA
259	84+454	Metalled Road	2.110	NA
260	84+485	Metalled Road	3.777	NA
261	84+627	Metalled Road	2.551	NA
262	84+793	Metalled Road	2.792	NA

263	85+215	Metalled Road	2.760	NA
264	85+248	Metalled Road	2.250	NA
265	85+396	Metalled Road	2.250	NA
266	85+618	Anayadi - Nooranad Road	2.602	NA
267	85+673	Pazhakulam - Anayadi Rd	4.296	NA
268	85+756	Metalled Road	2.088	NA
269	86+018	Metalled Road	4.053	NA
270	86+560	To pallickal Road	5.888	NA
271	87+120	Metalled Road	3.682	NA
272	87+245	Metalled Road	4.026	NA
273	87+409	Metalled Road	2.925	NA
274	87+849	Metalled Road	2.697	NA
275	88+250	To Pathanapuram Road	6.946	NA
276	88+615	To Ulavukuda Road	2.660	NA
277	89+058	To Bharanickuva Road	2.694	NA
278	89+640	Metalled Road	3.361	NA
279	90+217	Metalled Road	2.000	NA
280	90+233	Metalled Road	4.458	NA
281	90+329	Sasthanada Temple Rd	3.517	NA
282	90+458	Metalled Road	3.538	NA
283	90+652	To Vaddakidathukavu Road	3.608	NA
284	90+660	Metalled Road	1.503	NA
285	90+802	To Chencherili Road	2.278	NA
286	90+884	To Karingali puncha Road	1.701	NA
287	91+079	Metalled Road	2.644	NA
288	94+654	Ayranikudy Old Bridge Rd	6.460	NA
289	94+835	Metalled Road	2.463	NA
290	95+105	Kollakkadavu - Kulanada Rd	5.864	NA
291	95+375	Metalled Road	2.801	NA
292	95+954	To kolalakudaruvu kulanada Road	3.738	NA
293	96+657	Metalled Road	2.446	NA
294	97+147	To kozhuvallur Devi Temple Road	2.920	NA
295	97+517	To kozhuvallur kulanada Road	4.944	NA
296	98+043	To Karakkhad Road	3.390	NA
297	98+363	Metalled Road	1.861	NA
298	98+460	Metalled Road	2.610	NA
299	98+900	To Karakkhad Road	3.984	NA
300	98+937	Metalled Road	2.076	NA
301	99+082	Metalled Road	3.984	NA
302	99+571	Metalled Road	3.318	NA
303	100+529	Metalled Road	3.600	NA
304	199+776	Metalled Road	4.498	NA
305	200+148	Metalled Road	1.980	NA
306	200+261	Metalled Road	1.989	NA

307	200+265	Metalled Road	1.989	NA
308	200+317	Metalled Road	2.064	NA
309	200+331	Metalled Road	2.064	NA
310	200+736	Metalled Road	5.801	NA
311	201+042	Metalled Road	3.970	NA
312	201+053	Pookkattupady Kizhakkambalam Rd	5.184	NA
313	201+106	Pukkattupady-Aluva Road	6.866	NA
314	201+500	Metalled Road	2.696	NA
315	201+544	Metalled Road	2.696	NA
316	201+656	Metalled Road	2.645	NA
317	201+768	Metalled Road	3.256	NA
318	202+291	Metalled Road	2.578	NA
319	202+430	Metalled Road	2.467	NA
320	202+647	Metalled Road	3.030	NA
321	203+034	Metalled Road	2.343	NA
322	203+368	Metalled Road	4.579	NA
323	203+609	Nalam Mile Kurichipadam Rd	2.576	NA
324	203+721	Nalam Mile Kurichipadam Rd	2.809	NA
325	204+047	Metalled Road	2.256	NA
326	204+104	Metalled Road	6.593	NA
327	205+194	Vazhakulam-Keezhamadu Road	2.819	NA
328	207+246	Metalled Road	3.043	NA
329	207+536	Metalled Road	2.644	NA
330	207+545	Metalled Road	2.358	NA
331	207+572	Metalled Road	2.358	NA
332	207+592	Metalled Road	2.659	NA
333	207+661	Circular Rd	4.740	NA
334	207+669	Metalled Road	1.850	NA
335	207+924	Metalled Road	2.816	NA
336	207+982	Perumbavoor Aluva Rd	6.682	NA
337	208+075	Metalled Road	4.197	NA
338	208+146	Metalled Road	6.342	NA
339	208+643	Kalady - Aluva Rd	5.179	NA
340	208+748	Metalled Road	2.361	NA
341	209+174	Metalled Road	1.891	NA
342	210+023	Metalled Road	2.138	NA
343	210+318	Metalled Road	1.820	NA
344	210+586	Chowara - Neduvannoor - Airport	4.090	NA
345	211+064	Metalled Road	4.864	NA
346	212+539	Airport Rd	16.860	2.000
347	212+638	Old Airport Rd	7.171	NA
348	212+916	Kariyad - Airport - Mattoor Rd	5.612	NA
349	213+154	Metalled Road	1.934	NA
350	213+247	Metalled Road	2.667	NA

351	213+324	Metalled Road	2.950	NA
352	213+378	Metalled Road	3.307	NA
353	213+473	Metalled Road	2.402	NA
354	214+055	Metalled Road	1.975	NA
355	214+860	Metalled Road	2.564	NA
356	214+879	NH544	22.578	8.000
357	215+000	Metalled Road	5.847	NA
358	215+125	Metalled Road	4.516	NA
359	215+200	Metalled Road	2.807	NA
360	215+622	Angamaly - Manjaly Rd	5.367	NA
361	215+883	Metalled Road	8.502	NA
362	216+166	Metalled Road	2.526	NA
363	216+269	Metalled Road	2.427	NA
364	216+451	Metalled Road	1.576	NA
365	217+500	Metalled Road	5.137	NA
366	217+597	Metalled Road	2.081	NA
367	217+710	Metalled Road	2.872	NA
368	217+780	Metalled Road	2.572	NA
369	218+170	Puliyanam -Mangattukara Rd	3.306	NA
370	218+909	Karukutty Moozhikulam Rd	3.874	NA
371	219+024	Metalled Road	2.375	NA
372	219+109	Metalled Road	2.618	NA
373	219+909	Metalled Road	2.748	NA
374	219+971	Metalled Road	2.179	NA
375	220+010	Metalled Road	2.841	NA
376	220+204	Metalled Road	2.270	NA
377	220+313	Metalled Road	2.253	NA
378	220+393	Metalled Road	3.999	NA
379	220+629	Metalled Road	2.414	NA
380	221+030	Karukutty-Elavoor Rd	5.058	NA
381	221+384	Metalled Road	1.932	NA
382	221+997	Metalled Road	4.166	NA
383	222+560	Metalled Road	5.103	NA
384	223+296	Metalled Road	4.332	NA
385	223+595	Metalled Road	2.908	NA
386	223+847	Metalled Road	1.871	NA
387	223+964	Annamanada - Mala Pallipuram Rd	5.359	NA
388	225+706	Metalled Road	2.106	NA
389	226+187	Metalled Road	5.123	NA
390	227+305	Metalled Road	2.555	NA
391	227+715	Metalled Road	1.765	NA
392	228+070	Metalled Road	2.384	NA
393	228+188	Metalled Road	5.191	NA
394	228+785	Ashtamichira-Annamanada Rd	4.275	NA

395	229+321	Metalled Road	3.266	NA
396	229+610	Metalled Road	2.376	NA
397	229+790	Metalled Road	2.221	NA
398	229+973	Metalled Road	3.531	NA
399	230+081	Ashtamichira Chalakudi Rd	5.809	NA
400	231+151	Metalled Road	2.828	NA
401	231+319	Metalled Road	3.285	NA
402	231+398	Metalled Road	1.854	NA
403	231+477	Metalled Road	2.356	NA
404	231+606	Metalled Road	2.296	NA
405	232+057	Metalled Road	2.119	NA
406	232+081	Metalled Road	2.493	NA
407	232+236	Metalled Road	3.266	NA
408	232+601	Metalled Road	2.173	NA
409	232+964	Metalled Road	2.365	NA
410	233+225	Chalakudy-Kombodinjamakkal Rd	5.445	NA
411	233+314	Metalled Road	2.046	NA
412	233+400	Metalled Road	2.317	NA
413	233+648	Metalled Road	2.739	NA
414	234+153	Metalled Road	5.363	NA
415	234+391	SH51	5.621	NA
416	234+511	Metalled Road	3.200	NA
417	234+937	Metalled Road	5.469	NA
418	235+545	Metalled Road	2.626	NA
419	236+447	Metalled Road	2.493	NA
420	236+883	Metalled Road	4.293	NA
421	238+217	SH 61	7.718	NA
422	238+937	Metalled Road	2.053	NA
423	240+309	Metalled Road	3.000	NA
424	241+271	Metalled Road	2.811	NA
425	243+056	Anandapuram Nellai Rd	3.644	NA
426	243+858	Metalled Road	4.976	NA
427	246+084	Metalled Road	3.720	NA
428	246+393	Metalled Road	2.137	NA
429	246+720	Metalled Road	2.477	NA
430	246+923	Metalled Road	5.262	NA
431	247+328	Cross Rd	2.677	NA
432	247+597	Metalled Road	8.019	NA
433	247+690	Ettumuna Karuvannur Rd	5.327	NA
434	248+693	Metalled Road	4.492	NA
435	249+107	Metalled Road	2.703	NA
436	249+121	Metalled Road	1.601	NA
437	250+065	Metalled Road	5.435	NA
438	250+141	Kolathur Rd	4.681	NA

439	250+159	Metalled Road	2.767	NA
440	250+219	Metalled Road	1.461	NA
441	250+321	Metalled Road	3.565	NA
442	250+337	Metalled Road	2.563	NA
443	250+379	Metalled Road	1.533	NA
444	250+433	Metalled Road	2.077	NA
445	251+041	Metalled Road	3.157	NA
446	251+238	Metalled Road	2.291	NA
447	251+402	Ammadam - Cherpu Rd	3.444	NA
448	251+520	Metalled Road	2.241	NA
449	251+588	Metalled Road	2.711	NA
450	251+759	Perumbillissery-Pootharakkal By	1.798	NA
451	251+875	Metalled Road	4.293	NA
452	252+411	Metalled Road	3.043	NA
453	252+837	Chevoor - Pootharakkal Bypass R	4.069	NA
454	253+071	Metalled Road	2.882	NA
455	253+160	Metalled Road	2.687	NA
456	253+197	Metalled Road	2.407	NA
457	253+463	Metalled Road	2.234	NA
458	253+505	Metalled Road	2.224	NA
459	253+882	Chevvoor - Venginissery - Kodan	3.617	NA
460	254+458	Metalled Road	3.345	NA
461	254+521	Palakkal - Ammadam Rd	5.837	NA
462	254+656	Palakkal Veeyattupadam Kodannur	4.180	NA
463	255+138	Metalled Road	1.949	NA
464	255+202	Metalled Road	2.118	NA
465	256+120	Panamuck Rd	5.833	NA
466	256+566	Metalled Road	3.598	NA
467	256+710	Metalled Road	1.927	NA
468	256+740	Metalled Road	1.905	NA
469	256+835	Metalled Road	3.549	NA
470	257+044	Metalled Road	4.104	NA
471	257+100	Kodannur Nedupuzha W Fort Rd	5.490	NA
472	257+237	Kodannur Nedupuzha W Fort Rd	1.820	NA
473	257+332	Kasturba Rd	2.843	NA
474	257+469	Metalled Road	2.499	NA
475	257+513	Metalled Road	2.414	NA
476	257+701	Metalled Road	2.447	NA
477	257+766	Kadamangandam Rd	2.073	NA
478	258+016	Vadookara Rd	4.687	NA
479	258+133	Chandrika Line	3.402	NA
480	258+243	Metalled Road	1.704	NA
481	258+506	Metalled Road	2.921	NA
482	258+550	Metalled Road	2.981	NA

483	258+689	Metalled Road	3.213	NA
484	258+971	Metalled Road	1.891	NA
485	259+075	Metalled Road	3.014	NA
486	259+700	Metalled Road	2.324	NA
487	259+793	P&T Quarters Rd	6.913	NA
488	259+857	Metalled Road	6.952	NA
489	259+983	Metalled Road	10.290	1.000
490	260+100	Metalled Road	9.301	1.000
491	260+315	Azheekodan Rd	5.534	NA
492	260+807	Mahatma Gandi Rd	7.648	NA
493	261+148	Karikkath Ln	4.405	NA
494	261+928	Metalled Road	3.620	NA
495	262+135	Thrissur - Kunnamkulam Rd	6.974	NA
496	262+351	Kuttankulangara Ln	2.200	NA
497	262+497	Metalled Road	2.554	NA
498	264+264	Padikkala Rd	2.087	NA
499	264+708	Metalled Road	3.221	NA
500	264+776	Metalled Road	3.148	NA
501	264+821	Metalled Road	3.168	NA
502	264+908	Metalled Road	3.148	NA
503	265+048	Metalled Road	3.129	NA
504	265+166	Metalled Road	1.780	NA
505	265+259	Metalled Road	2.567	NA
506	265+319	Metalled Road	3.280	NA
507	265+370	Mundur - Kottekkad Rd	4.925	NA
508	265+533	Metalled Road	2.260	NA
509	265+566	Metalled Road	1.331	NA
510	265+592	Attore School Rd	1.809	NA
511	265+890	ST.Ann's School Rd	2.897	NA
512	266+241	Attore Rd	2.684	NA
513	266+383	Metalled Road	2.684	NA
514	266+415	Metalled Road	2.687	NA
515	266+578	Metalled Road	1.376	NA
516	266+630	Metalled Road	2.220	NA
517	266+717	Metalled Road	6.016	NA
518	266+726	Metalled Road	2.466	NA
519	266+890	Metalled Road	2.845	NA
520	267+074	Metalled Road	2.077	NA
521	267+269	Metalled Road	2.259	NA
522	267+574	Metalled Road	2.036	NA
523	267+727	Temple Garden Rd	3.118	NA
524	267+798	Metalled Road	4.325	NA
525	268+347	Mundur Kottekkad Rd	2.352	NA
526	269+153	Metalled Road	5.154	NA

527	269+231	Metalled Road	1.578	NA
528	269+299	Metalled Road	1.950	NA
529	269+378	Mundur Kottekkad Rd	6.403	NA
530	269+462	Metalled Road	1.559	NA
531	269+542	Metalled Road	2.257	NA
532	269+667	Metalled Road	2.745	NA
533	270+071	Metalled Road	3.091	NA
534	270+099	Mundur Kottekkad Rd	5.568	NA
535	270+146	Metalled Road	3.850	NA
536	270+222	Metalled Road	2.740	NA
537	270+273	Metalled Road	1.928	NA
538	270+303	Metalled Road	2.802	NA
539	270+473	Metalled Road	2.735	NA
540	270+821	Metalled Road	3.157	NA
541	271+227	Metalled Road	2.975	NA
542	271+330	Avanoor Mundur Rd	4.930	NA
543	271+481	Avanoor Mundur Rd	4.970	NA
544	271+543	Metalled Road	2.944	NA
545	272+079	Metalled Road	2.750	NA
546	272+099	Ayyankunnu Industrial Estate Rd	2.654	NA
547	272+312	Metalled Road	2.530	NA
548	272+695	Metalled Road	2.885	NA
549	273+190	Arampilly Rd	3.918	NA
550	273+330	Kaiparambu - Kollannur Rd	2.306	NA
551	273+591	Metalled Road	2.680	NA
552	273+726	Kaiparambu - Thalakottukara Rd	2.680	NA
553	273+920	Metalled Road	2.613	NA
554	274+074	Metalled Road	2.945	NA
555	274+094	Kaiparambu - Thalakottukara Rd	5.390	NA
556	274+782	Metalled Road	3.224	NA
557	274+868	Metalled Road	2.130	NA
558	274+875	Metalled Road	2.794	NA
559	275+200	Metalled Road	2.604	NA
560	275+287	Metalled Road	2.720	NA
561	275+399	Metalled Road	2.308	NA
562	275+427	Metalled Road	2.111	NA
563	275+579	Metalled Road	2.807	NA
564	275+851	Metalled Road	4.535	NA
565	275+967	Wadakkancherry - Kecheri Rd	6.999	NA
566	276+055	Metalled Road	2.503	NA
567	276+605	Metalled Road	6.720	NA
568	276+662	Parappukavu Rd	2.829	NA
569	276+904	Pattikkara to Paranoor Rd	2.764	NA
570	277+019	Metalled Road	2.386	NA

571	277+084	Metalled Road	2.187	NA
572	277+169	Pattikkara - Parannur Rd	3.226	NA
573	277+851	Metalled Road	2.415	NA
574	278+790	Metalled Road	2.095	NA
575	279+067	Metalled Road	5.238	NA
576	280+088	Metalled Road	2.784	NA
577	280+862	Metalled Road	2.590	NA
578	281+446	Metalled Road	2.911	NA
579	281+779	Metalled Road	2.022	NA
580	281+792	Metalled Road	2.017	NA
581	281+994	Metalled Road	7.295	NA
582	282+115	Metalled Road	2.435	NA
583	283+285	Metalled Road	1.592	NA
584	283+449	Sitaram Mill Rd	9.811	NA
585	283+560	Metalled Road	2.931	NA
586	283+910	Metalled Road	3.483	NA
587	284+220	Metalled Road	3.221	NA
588	284+250	Metalled Road	2.150	NA
589	284+448	Metalled Road	3.265	NA
590	284+593	Metalled Road	2.623	NA
591	284+858	Metalled Road	2.075	NA
592	284+916	Metalled Road	3.184	NA
593	285+048	Metalled Road	2.931	NA
594	285+433	Metalled Road	7.104	NA
595	285+636	Kottol-Aruvai M D College Rd	2.956	NA
596	285+806	Metalled Road	4.657	NA
597	286+154	Aruvai-Kottol Rd	2.858	NA
598	286+164	Metalled Road	2.483	NA
599	286+271	Metalled Road	2.452	NA
600	286+437	Metalled Road	2.808	NA
601	286+693	Metalled Road	1.328	NA
602	286+763	Perumbilavu-Pazhanji Rd	4.853	NA
603	286+957	Metalled Road	2.354	NA
604	287+031	Metalled Road	2.765	NA
605	287+043	Metalled Road	2.333	NA
606	287+318	Pazhanji-Kadavallor Rd	5.182	NA
607	287+916	Metalled Road	2.730	NA
608	288+023	Metalled Road	2.919	NA
609	288+080	Metalled Road	2.600	NA
610	288+279	Metalled Road	2.575	NA
611	289+037	Metalled Road	4.909	NA
612	290+059	Metalled Road	2.900	NA
613	290+241	Metalled Road	3.361	NA
614	290+619	Metalled Road	1.899	NA

615	291+524	Sitaram Mill Rd	11.889	NA
616	292+058	Metalled Road	2.547	NA
617	292+383	Metalled Road	2.012	NA
618	292+716	Metalled Road	1.790	NA
619	293+034	Metalled Road	4.157	NA
620	293+342	Sitaram Mill Rd	3.793	NA
621	293+685	Metalled Road	3.343	NA
622	293+745	Metalled Road	1.775	NA
623	294+041	Metalled Road	2.430	NA
624	294+065	Metalled Road	2.728	NA
625	294+176	Metalled Road	2.399	NA
626	294+790	Metalled Road	2.482	NA
627	294+951	Metalled Road	2.561	NA
628	295+315	Metalled Road	3.184	NA
629	296+881	Naduvattam-Thanneerkodu Rd	5.380	NA
630	296+996	Metalled Road	2.386	NA
631	297+053	Metalled Road	3.589	NA
632	298+039	Palakkad-Ponnani Rd	6.768	NA
633	298+286	Metalled Road	2.205	NA
634	298+337	Metalled Road	2.588	NA
635	298+414	Metalled Road	2.661	NA
636	298+631	Anakkara-Edappal Rd	2.552	NA
637	299+283	Annakkampad-Mudur Rd	3.287	NA
638	300+582	Metalled Road	1.960	NA
639	300+813	Edapally-Panvel Hwy	12.132	NA
640	300+890	Metalled Road	2.652	NA
641	302+470	Metalled Road	3.932	NA
642	302+550	Nadakkavu-Parappuram-Nariparamb	5.659	NA
643	303+610	Metalled Road	3.850	NA
644	304+118	Metalled Road	3.059	NA
645	304+700	Ponnani-Kuttipuram Rd	4.381	NA
646	304+780	Metalled Road	9.346	NA
647	305+224	Metalled Road	2.546	NA
648	305+993	Tavanur-Kadakassery-Kuttippuram	4.191	NA
649	307+694	Tirur-Kuttipuram Rd	7.681	NA
650	308+422	MES School Road	3.906	NA
651	308+452	Metalled Road	3.007	NA
652	308+621	Metalled Road	2.995	NA
653	311+257	Koloopalam-Mukkilapeedika Rd	5.486	NA
654	313+609	Kattachira Rd	3.058	NA
655	316+317	Bhadarakavu Rd	5.947	NA
656	316+414	Bhadarakavu Rd	3.511	NA
657	316+440	Tirur-Vailathur Rd	12.929	NA
658	316+500	Metalled Road	3.802	NA

659	317+333	Metalled Road	2.829	NA
660	317+735	Metalled Road	4.445	NA
661	319+744	Meenadathur Gate Rd	5.277	NA
662	319+763	Meenadathur Gate Rd	4.092	NA
663	319+954	Metalled Road	3.389	NA
664	321+327	Metalled Road	2.780	NA
665	321+359	Metalled Road	2.782	NA
666	322+633	Metalled Road	3.435	NA
667	322+800	Metalled Road	7.338	NA
668	322+869	Metalled Road	3.675	NA
669	322+954	Metalled Road	5.571	NA
670	325+111	Venniyour-Thanur	5.462	NA
671	328+760	Olappeedika Rd	5.141	NA
672	330+721	Murikkal Chiramangalam Rd	5.593	NA
673	331+816	Metalled Road	5.047	NA
674	333+443	Metalled Road	2.576	NA
675	333+500	Anangadi-Parapanangadi Rd	7.237	NA
676	335+234	Metalled Road	1.762	NA
677	335+669	Chettipadi Rd	6.715	NA
678	337+394	Metalled Road	2.956	NA
679	340+636	Anangadi - Athanikkal Rd	5.785	NA
680	342+924	Metalled Road	3.459	NA
681	342+924	Metalled Road	2.643	NA
682	343+464	Metalled Road	2.640	NA
683	343+550	Chaliyam - Kadalundi Rd	2.730	NA
684	343+606	Kadalundi Road	6.877	NA
685	344+011	Metalled Road	2.223	NA
686	344+385	Metalled Road	3.399	NA
687	344+626	Metalled Road	2.124	NA
688	345+090	Mullapalli Chaliyam Rd	5.879	NA
689	345+330	Metalled Road	3.288	NA
690	347+561	Dr.Ambedkar Road	3.278	NA
691	348+275	Feroke - Karuvanthuruthy Rd	5.277	NA
692	349+325	Beypore Cheruvannur Rd	7.551	NA
693	350+216	Metalled Road	8.625	NA
694	350+732	Metalled Road	2.181	NA
695	352+851	Metalled Road	2.068	NA
696	352+915	Metalled Road	1.159	NA
697	352+915	Metalled Road	1.207	NA
698	353+300	Metalled Road	11.490	NA
699	353+364	Metalled Road	2.706	NA
700	353+558	Metalled Road	4.555	NA
701	353+948	Metalled Road	2.117	NA
702	354+128	Metalled Road	3.063	NA

703	354+183	Metalled Road	1.245	NA
704	354+394	Metalled Road	1.975	NA
705	354+553	Metalled Road	1.621	NA
706	354+928	Metalled Road	2.269	NA
707	355+170	Metalled Road	1.633	NA
708	355+364	Metalled Road	1.376	NA
709	355+500	Panniyankara Overbridge	6.663	NA
710	355+800	Metalled Road	2.012	NA
711	356+033	Metalled Road	2.665	NA
712	356+100	Metalled Road	2.619	NA
713	356+142	Metalled Road	3.070	NA
714	356+600	Metalled Road	3.771	NA
715	356+733	Metalled Road	2.190	NA
716	356+746	Metalled Road	2.856	NA
717	356+866	Metalled Road	2.546	NA
718	356+939	Metalled Road	2.357	NA
719	356+978	Metalled Road	1.243	NA
720	356+978	Metalled Road	1.243	NA
721	357+007	Metalled Road	2.503	NA
722	357+139	Metalled Road	4.816	NA
723	357+178	Francis Rd	7.217	NA
724	357+405	Metalled Road	1.327	NA
725	357+537	Metalled Road	5.327	NA
726	357+720	Metalled Road	4.470	NA
727	358+000	Old Railway Overbridge	20.051	NA
728	358+149	Metalled Road	4.279	NA
729	358+226	Metalled Road	9.922	NA
730	358+325	Metalled Road	8.212	NA
731	358+424	Metalled Road	5.129	NA
732	358+465	Metalled Road	1.584	NA
733	358+574	Metalled Road	3.578	NA
734	358+647	Metalled Road	1.173	NA
735	358+900	Metalled Road	15.033	NA
736	359+800	Gandhi Rd	7.070	NA
737	360+031	Valiyathodi Rd	3.010	NA
738	360+100	Metalled Road	1.439	NA
739	360+236	Metalled Road	5.081	NA
740	360+383	Metalled Road	1.299	NA
741	360+449	Metalled Road	1.024	NA
742	360+515	Metalled Road	1.005	NA
743	360+586	Metalled Road	0.809	NA
744	360+621	Metalled Road	1.289	NA
745	360+697	Metalled Road	2.242	NA
746	360+807	Metalled Road	0.932	NA

747	360+870	Metalled Road	0.995	NA
748	360+928	Metalled Road	1.260	NA
749	360+955	Metalled Road	1.463	NA
750	361+175	Metalled Road	2.191	NA
751	361+286	Metalled Road	5.177	NA
752	361+339	Metalled Road	2.468	NA
753	361+430	Metalled Road	1.709	NA
754	361+582	Metalled Road	1.842	NA
755	361+700	Metalled Road	3.162	NA
756	361+739	Metalled Road	3.140	NA
757	361+864	Metalled Road	1.900	NA
758	362+125	Metalled Road	2.977	NA
759	362+341	Metalled Road	4.883	NA
760	362+577	Metalled Road	5.507	NA
761	362+908	Metalled Road	4.714	NA
762	363+138	Metalled Road	0.987	NA
763	363+152	Bhatt Rd	5.417	NA
764	363+400	Metalled Road	0.976	NA
765	363+431	Metalled Road	1.245	NA
766	363+472	Poozhiyil Rd	1.237	NA
767	363+670	Metalled Road	1.601	NA
768	363+730	Metalled Road	2.074	NA
769	363+789	Metalled Road	2.343	NA
770	364+129	Metalled Road	4.956	NA
771	364+578	Metalled Road	2.101	NA
772	365+038	Metalled Road	2.334	NA
773	366+669	Metalled Road	6.318	NA
774	366+877	Metalled Road	4.447	NA
775	366+911	Metalled Road	1.819	NA
776	367+129	Metalled Road	1.968	NA
777	367+200	Metalled Road	1.960	NA
778	367+318	Metalled Road	1.597	NA
779	367+452	Metalled Road	2.076	NA
780	367+516	Metalled Road	2.404	NA
781	367+540	Metalled Road	2.404	NA
782	367+621	Metalled Road	1.879	NA
783	367+721	Metalled Road	1.272	NA
784	367+815	Metalled Road	2.381	NA
785	367+835	Metalled Road	1.692	NA
786	367+926	Metalled Road	1.447	NA
787	368+068	Metalled Road	1.928	NA
788	368+110	Metalled Road	2.598	NA
789	368+200	Metalled Road	1.786	NA
790	368+409	Metalled Road	1.254	NA

791	368+509	Metalled Road	5.642	NA
792	368+595	Metalled Road	2.439	NA
793	368+643	Metalled Road	1.561	NA
794	368+710	Metalled Road	1.621	NA
795	368+731	Metalled Road	1.399	NA
796	368+803	Metalled Road	2.172	NA
797	369+086	Metalled Road	9.402	NA
798	369+150	Metalled Road	2.075	NA
799	369+295	Metalled Road	3.788	NA
800	369+422	Metalled Road	2.050	NA
801	369+485	Metalled Road	1.778	NA
802	369+748	Metalled Road	2.013	NA
803	369+951	Metalled Road	2.535	NA
804	370+156	Metalled Road	2.639	NA
805	370+889	Metalled Road	2.500	NA
806	370+953	Metalled Road	2.000	NA
807	371+267	Metalled Road	2.700	NA
808	371+400	Metalled Road	3.000	NA
809	371+600	Metalled Road	2.900	NA
810	371+635	Metalled Road	2.000	NA
811	371+700	Kannankadavu Rd	6.938	NA
812	372+155	Metalled Road	5.413	NA
813	372+588	Metalled Road	2.800	NA
814	374+100	Kappad - Thiruvangoor Rd	6.121	NA
815	374+252	Metalled Road	3.200	NA
816	375+343	Metalled Road	5.063	NA
817	375+446	Pookad Beach Road	3.788	NA
818	377+317	Poilkave - Beach Road	4.704	NA
819	378+290	Metalled Road	2.100	NA
820	378+305	Metalled Road	2.000	NA
821	378+642	Metalled Road	1.835	NA
822	378+681	Metalled Road	3.133	NA
823	378+950	Metalled Road	2.615	NA
824	379+020	Metalled Road	3.354	NA
825	379+115	Metalled Road	1.608	NA
826	379+173	Metalled Road	3.083	NA
827	379+234	Metalled Road	7.244	NA
828	379+234	Metalled Road	6.000	NA
829	379+603	Metalled Road	2.192	NA
830	381+525	Metalled Road	7.000	NA
831	382+823	Metalled Road	2.500	NA
832	383+700	Kollam - Meppayyur Rd	4.948	NA
833	384+400	Metalled Road	5.830	NA
834	385+586	Metalled Road	2.330	NA

835	387+057	Metalled Road	5.945	NA
836	387+277	Metalled Road	2.554	NA
837	387+900	Metalled Road	2.400	NA
838	387+919	Metalled Road	2.400	NA
839	388+945	Metalled Road	3.617	NA
840	389+138	Metalled Road	3.004	NA
841	390+176	Metalled Road	5.200	NA
842	390+863	Metalled Road	2.407	NA
843	390+950	Metalled Road	3.000	NA
844	392+149	Metalled Road	3.200	NA
845	392+619	Pallikkara Road	5.917	NA
846	393+172	Metalled Road	5.700	NA
847	393+365	Metalled Road	2.037	NA
848	393+451	Metalled Road	3.593	NA
849	393+522	Metalled Road	2.026	NA
850	393+864	Metalled Road	4.281	NA
851	394+000	Metalled Road	2.240	NA
852	395+984	Metalled Road	2.846	NA
853	397+582	Metalled Road	2.158	NA
854	397+693	Metalled Road	3.001	NA
855	398+639	Metalled Road	3.725	NA
856	398+828	Metalled Road	3.417	NA
857	399+337	Metalled Road	3.039	NA
858	399+414	Metalled Road	4.500	NA
859	399+624	Metalled Road	3.000	NA
860	400+275	Metalled Road	4.034	NA
861	400+923	Vatakara - Thiruvallur - Peramb	5.285	NA
862	402+010	Kavil Rd	4.500	NA
863	402+480	Kuttiadi - Theekkuni - Ayancher	5.200	NA
864	402+659	Metalled Road	4.200	NA
865	403+118	Metalled Road	2.200	NA
866	403+296	Metalled Road	1.883	NA
867	404+076	Vatakara - Villiappally Rd	7.181	NA
868	406+115	Chethamangalam Kuzhakode Vellan	5.208	NA
869	406+930	Metalled Road	3.021	NA
870	407+303	Metalled Road	3.323	NA
871	407+304	Metalled Road	3.417	NA
872	407+779	Thottilpalam Rd	9.111	NA
873	408+091	Metalled Road	3.434	NA
874	408+471	Nadapuram Railway Station Rd	3.555	NA
875	408+939	Metalled Road	3.291	NA
876	409+056	Metalled Road	2.111	NA
877	409+061	Metalled Road	3.067	NA
878	409+291	Metalled Road	1.879	NA

879	409+466	MAdappally Railway Rd	3.897	NA
880	410+971	Metalled Road	3.878	NA
881	411+800	Metalled Road	4.019	NA
882	412+133	Metalled Road	2.907	NA
883	412+431	Avikkara Temple Rd	3.600	NA
884	413+768	Orkatteri - Kunhipally - Mothal	6.898	NA
885	414+667	NH7 to Koroth Rd Connection	4.047	NA
886	415+374	Metalled Road	5.400	NA
887	416+144	Metalled Road	2.987	NA
888	417+355	Mahe - Chokli Rd	5.748	NA
889	418+686	Palloor Community hall Rd	4.288	NA
890	419+021	Palloor Community hall Rd	5.406	NA
891	419+445	Metalled Road	2.799	NA
892	419+543	Metalled Road	2.892	NA
893	419+692	Metalled Road	2.877	NA
894	419+716	Thalassery - Nadapuram Rd	7.342	NA
895	419+865	Palloor Rd	3.259	NA
896	419+966	Metalled Road	2.121	NA
897	420+140	Metalled Road	2.793	NA
898	420+181	Metalled Road	2.487	NA
899	420+196	Metalled Road	2.740	NA
900	420+751	Pookome-Madapeedika Rd	5.126	NA
901	421+822	Pandakkal - Manekkara - Panoor	5.440	NA
902	423+112	Thalassery-Koppalam-Panoor Rd	7.000	NA
903	423+565	Kopaalam - PonniyamPaalam Rd	4.500	NA
904	423+821	Metalled Road	2.000	NA
905	423+867	Metalled Road	2.261	NA
906	424+295	Metalled Road	4.245	NA
907	424+622	Metalled Road	3.209	NA
908	425+197	Metalled Road	2.050	NA
909	425+700	Thalassery - Coorg Hwy	10.244	NA
910	426+085	Kayalode Kadirur Rd	2.508	NA
911	426+112	Metalled Road	0.974	NA
912	426+169	Metalled Road	0.913	NA
913	426+743	Metalled Road	6.064	NA
914	427+890	Metalled Road	3.095	NA
915	427+962	Metalled Road	2.265	NA
916	428+107	Metalled Road	2.942	NA
917	428+529	Thottummal Panthakkapara Rd	4.464	NA
918	428+687	Metalled Road	3.047	NA
919	428+873	Compounder Shop Panthakkappara	2.115	NA
920	428+993	Metalled Road	3.177	NA
921	429+541	Panthakkapara Pinarayi Rd	5.245	NA
922	429+623	Metalled Road	2.600	NA

923	430+325	Pinarayi - Kayalode Road	3.000	NA
924	430+780	Thalassery - Irikkur Rd	6.532	NA
925	432+211	Metalled Road	3.000	NA
926	432+842	Edakkadavu School Rd	2.843	NA
927	432+985	Metalled Road	3.443	NA
928	433+345	Metalled Road	6.137	NA
929	433+476	Metalled Road	2.253	NA
930	433+932	Muthappan Madappura Rd	6.976	NA
931	433+992	Metalled Road	2.062	NA
932	434+455	Mocheri Rd	3.726	NA
933	434+557	Kavu Rd	2.100	NA
934	435+002	A K G Rd	3.656	NA
935	435+248	Metalled Road	2.218	NA
936	435+422	Metalled Road	3.101	NA
937	435+600	Kadachira Mamakkunnu Rd	5.176	NA
938	435+676	Metalled Road	2.500	NA
939	436+064	Metalled Road	2.500	NA
940	436+194	Puthiyangadi Koothuparamba-Chov	5.000	NA
941	436+194	Puthiyangadi Koothuparamba-Chov	2.500	NA
942	437+111	Kadachira Rd	4.000	NA
943	437+740	Puthiyangadi Koothuparamba-Chov	3.003	NA
944	438+247	MT Rd	3.553	NA
945	438+526	Metalled Road	3.170	NA
946	438+660	Metalled Road	3.501	NA
947	438+853	Metalled Road	2.142	NA
948	439+003	Metalled Road	4.200	NA
949	439+405	Puthiyangadi Koothuparamba-Chov	6.470	NA
950	439+602	Metalled Road	2.709	NA
951	439+604	Metalled Road	1.884	NA
952	439+819	Chirakkuthazhe Rail Rd	4.244	NA
953	440+600	Metalled Road	6.940	NA
954	440+800	Metalled Road	5.207	NA
955	441+274	Metalled Road	6.701	NA
956	442+400	Metalled Road	6.927	NA
957	442+500	Metalled Road	11.834	NA
958	443+115	Thayyil - Marakkarkandy Rd	6.009	NA
959	443+365	Metalled Road	1.757	NA
960	443+585	Metalled Road	2.257	NA
961	443+767	Metalled Road	3.500	NA
962	443+864	Metalled Road	2.454	NA
963	444+032	Tharachambarath Rd	2.959	NA
964	444+311	Metalled Road	3.171	NA
965	444+564	Metalled Road	4.075	NA
966	444+738	Metalled Road	3.887	NA

967	444+957	Metalled Road	1.906	NA
968	445+321	Metalled Road	3.762	NA
969	445+539	Thana - Anayidukku Rd	5.140	NA
970	446+020	Thayatheru - Kazanakotta Rd	4.715	NA
971	446+551	Metalled Road	3.277	NA
972	446+675	Central Avenue Rd	24.708	4.000
973	447+214	Kadakodu	10.282	NA
974	447+500	SP Office Rd	10.877	NA
975	447+538	Metalled Road	7.014	NA
976	447+627	Railway Station Rd	6.507	NA
977	448+778	Metalled Road	3.000	NA
978	449+210	Pannanpara Rd	3.464	NA
979	449+645	Metalled Road	2.500	NA
980	450+637	Metalled Road	2.570	NA
981	451+196	Metalled Road	3.509	NA
982	452+350	Alvil - Arattuvayal Rd	6.000	NA
983	453+249	Metalled Road	1.682	NA
984	453+383	Metalled Road	2.000	NA
985	454+062	Railway Station Rd	6.000	NA
986	455+240	Metalled Road	8.562	NA
987	455+240	Metalled Road	5.800	NA
988	456+907	Metalled Road	3.179	NA
989	457+158	Metalled Road	3.158	NA
990	457+730	Kalliasseri-Pazhanchira Rd	3.304	NA
991	458+221	Irinave-Madakkara Rd	3.175	NA
992	458+425	Kovvappuram - Irinavu Bypass Rd	4.564	NA
993	460+785	Morazha Kannapuram Rd	4.851	NA
994	461+847	Chunda Rd	2.812	NA
995	462+320	Sri Annapoorneswary Temple Road	4.607	NA
996	462+906	Metalled Road	2.199	NA
997	462+966	Metalled Road	2.199	NA
998	463+307	Odayammadam Rd	2.453	NA
999	463+341	Metalled Road	2.923	NA
1000	464+027	Kunnanangadu - Pazhangodu Rd	6.103	NA
1001	464+062	Thavam-Dalil-Kovvappuram Road	3.209	NA
1002	464+241	Thavam-Dalil-Kovvappuram Road	2.079	NA
1003	464+600	Thavam-Dalil-Kovvappuram Road	3.509	NA
1004	467+106	Thavam Road	2.405	NA
1005	467+518	Thavam Koormbakavu Rd	2.387	NA
1006	467+814	Thavam Road	2.549	NA
1007	468+325	Ezhome Rd	4.654	NA
1008	468+624	Chengal Rd	4.099	NA
1009	468+800	Pazhayangadi Rd	7.159	NA
1010	469+078	Payangadi Taliparamba Rd	5.660	NA

1011	469+378	Pazhayangadi Vengara Rd	3.062	NA
1012	471+022	Metalled Road	2.416	NA
1013	471+903	Chempallikuntu-Anikkara-Ramapur	3.552	NA
1014	472+638	Hanumarambalam Rd	1.961	NA
1015	472+672	Vengara Chempallikundu Road	4.075	NA
1016	473+754	Metalled Road	3.076	NA
1017	473+766	Metalled Road	3.751	NA
1018	473+800	Metalled Road	2.190	NA
1019	474+463	Metalled Road	5.039	NA
1020	474+953	Moosarikovvil Kuthirummal Rd	3.229	NA
1021	474+997	Moosarikovvil Kuthirummal Rd	2.939	NA
1022	476+828	Metalled Road	2.281	NA
1023	477+380	Metalled Road	1.680	NA
1024	477+572	Metalled Road	1.663	NA
1025	477+776	Metalled Road	3.682	NA
1026	477+944	Metalled Road	2.221	NA
1027	478+015	Metalled Road	3.518	NA
1028	478+090	Kurunkadavu Road	8.489	NA
1029	478+744	Metalled Road	2.000	NA
1030	478+995	Metalled Road	1.888	NA
1031	480+004	Temple Rd	3.496	NA
1032	480+018	Metalled Road	6.474	1.000
1033	480+132	Railway Over Bridge	7.306	NA
1034	480+275	Metalled Road	4.374	NA

1035	481+377	Metalled Road	2.400	NA
1036	482+375	Metalled Road	3.000	NA
1037	482+568	Kannankai Elambachi Rd	2.400	NA
1038	483+448	Karayil Rd	4.002	NA
1039	484+600	Beerichery Road	3.010	NA
1040	484+660	Thrikaripur-olavara-payyanur Rd	5.800	NA
1041	485+282	Metalled Road	6.000	NA
1042	485+989	Stadium-Church Rd	3.000	NA
1043	486+200	Metalled Road	3.073	NA
1044	487+179	Metalled Road	1.450	NA
1045	487+400	Cheruvathur - Padne - Edachkkai	5.486	NA
1046	491+637	Paduvalam - Varakkottu Vayal Rd	2.399	NA
1047	492+037	Thottam-Padne Road	5.189	NA
1048	493+485	Cheruvathur - Padne - Edachkkai	7.000	NA
1049	497+152	Kasaragod - Kannur Rd	6.871	NA
1050	497+169	Kasaragod - Kannur Rd	7.169	NA
1051	497+900	Pallikkara -Kunhippulikkal	3.485	NA
1052	498+046	Metalled Road	2.654	NA
1053	498+245	Metalled Road	2.943	NA
1054	498+916	Metalled Road	2.950	NA
1055	499+294	Metalled Road	7.351	NA
1056	499+618	Metalled Road	2.103	NA
1057	500+266	Metalled Road	2.769	NA
1058	500+838	Metalled Road	1.926	NA
1059	501+746	Metalled Road	2.968	NA
1060	502+009	Metalled Road	2.968	NA
1061	502+100	Edappally-Panvel Highway	7.432	NA
1062	502+135	Metalled Road	3.149	NA
1063	507+129	Metalled Road	4.819	NA
1064	507+500	Metalled Road	2.911	NA
1065	508+034	Metalled Road	3.880	NA
1066	508+770	Sree Muthappan Tample Road	4.279	NA
1067	509+453	Metalled Road	2.798	NA
1068	509+462	Iqbal School-kanhangad Road	5.060	NA
1069	509+569	Metalled Road	2.804	NA
1070	510+128	Metalled Road	2.368	NA
1071	510+153	Metalled Road	2.444	NA
1072	510+280	Metalled Road	2.415	NA
1073	514+393	Metalled Road	2.770	NA
1074	514+697	Metalled Road	4.507	NA
1075	517+774	Edapally-Panvel Highway	7.337	NA
1076	518+384	Kottakkunnu-Mauval Road	3.020	NA
1077	518+620	Metalled Road	1.978	NA
1078	518+905	Metalled Road	1.716	NA

1079	518+908	Metalled Road	2.518	NA
1080	519+011	Bekal-Periyattadukkam Road	5.462	NA
1081	519+254	Metalled Road	2.290	NA
1082	519+744	Metalled Road	7.582	NA
1083	520+363	TT Road	5.106	NA
1084	520+661	Metalled Road	2.696	NA
1085	521+237	Podipalam-Palakunnu Road	6.388	NA
1086	521+318	Metalled Road	1.924	NA
1087	521+525	Metalled Road	2.035	NA
1088	521+608	Metalled Road	1.535	NA
1089	522+098	Kottikkulam-Arattu Kadavu Road	4.904	NA
1090	522+198	Metalled Road	1.469	NA
1091	522+549	Choyichingal Road	3.345	NA
1092	522+756	Metalled Road	2.378	NA
1093	522+888	Metalled Road	2.106	NA
1094	522+892	Metalled Road	2.106	NA
1095	523+015	Kasaragod-Kannur Road	10.037	NA
1096	523+790	Padinhar Road	5.760	NA
1097	524+630	Metalled Road	2.722	NA
1098	525+364	Holiday Bekal Resorts Road	3.643	NA
1099	525+697	Metalled Road	2.931	NA
1100	525+758	Metalled Road	2.720	NA
1101	527+356	Keezhur Road	5.302	NA
1102	529+149	Metalled Road	2.736	NA
1103	529+550	Metalled Road	2.407	NA
1104	529+760	Metalled Road	3.245	NA
1105	530+013	Metalled Road	3.966	NA
1106	530+144	Metalled Road	4.154	NA
1107	530+218	Metalled Road	2.006	NA
1108	530+266	Metalled Road	3.106	NA
1109	530+366	Metalled Road	2.020	NA
1110	530+416	Metalled Road	1.850	NA
1111	530+977	Metalled Road	2.926	NA
1112	531+428	Metalled Road	1.804	NA
1113	531+528	Metalled Road	4.420	NA
1114	531+968	Metalled Road	3.574	NA
1115	532+385	Metalled Road	8.044	NA

DETAILS/LIST OF POWER LINE CROSSING

Sl.No.	TYPE OF POWER LINE CROSSING	CHAINAGE	X	Y	"Z VALUE" OF LOWEST CONDUCTOR
1	Electrical Line	CH:1+400 to CH:1+500_right	707825.278	942481.062	10.278
2	Electrical Line	CH:1+500 to CH:1+600_left	707796.216	942504.622	9.282
3	Electrical Line	CH:1+800 to CH:1+900_left	707537.096	942745.408	8.783
4	Electrical Line	CH:1+800 to CH:1+900_left	707558.864	942736.256	11.096
5	Electrical Line	CH:1+800 to CH:1+900_right	707558.052	942743.932	10.375
6	Electrical Line	CH:1+900 to CH:2+000_left	707510.535	942770.271	8.432
7	Electrical Line	CH:2+000 to CH:2+100_left	707410.745	942914.538	9.562
8	Electrical Line	CH:2+000 to CH:2+100_right	707417.191	942911.054	10.201
9	High Transmission Line	CH:2+000 to CH:2+100_right	707511.407	942891.177	10.084
10	Electrical Line	CH:2+200 to CH:2+300_left	707313.151	943033.572	10.786
11	Electrical Line	CH:2+400 to CH:2+500_right	707218.252	943198.444	9.400
12	Electrical Line	CH:2+400 to CH:2+500_right	707241.056	943184.735	9.532
13	High Transmission Line	CH:3+200 to CH:3+300_left	706792.994	943949.934	20.767
14	High Transmission Line	CH:3+500 to CH:3+600_left	706667.763	944126.319	20.797
15	Electrical Line	CH:4+100 to CH:4+200_right	706429.667	944681.910	10.217
16	Electrical Line	CH:5+900 to CH:6+000_right	706152.847	946500.390	13.677
17	Electrical Line	CH:6+000 to CH:6+100_left	706149.928	946531.836	13.060
18	Electrical Line	CH:6+000 to CH:6+100_right	706161.352	946550.323	12.440
19	Electrical Line	CH:6+000 to CH:6+100_right	706160.496	946607.771	12.325
20	High Transmission Line	CH:6+100 to CH:6+200_right	706182.790	946635.531	23.651
21	Electrical Line	CH:6+200 to CH:6+300_right	706132.154	946757.962	13.797
22	Electrical Line	CH:6+300 to CH:6+400_right	706131.513	946834.356	12.289
23	Electrical Line	CH:6+400 to CH:6+500_right	706102.181	946962.611	12.989
24	Electrical Line	CH:6+800 to CH:6+900_right	705946.360	947361.852	13.464
25	Electrical Line	CH:7+200 to CH:7+300_left	705739.117	947641.068	14.385
26	Electrical Line	CH:7+200 to CH:7+300_left	705737.983	947655.567	14.408
27	Electrical Line	CH:7+200 to CH:7+300_left	705719.581	947685.062	15.049
28	Electrical Line	CH:7+200 to CH:7+300_left	705707.298	947704.475	14.280
29	Electrical Line	CH:7+200 to CH:7+300_right	705727.788	947697.173	13.986
30	Electrical Line	CH:7+600 to CH:7+700_right	705488.680	948034.374	13.571
31	Electrical Line	CH:7+900 to CH:8+000_left	705278.622	948246.086	14.011
32	Electrical Line	CH:8+200 to CH:8+300_left	705127.375	948433.053	15.298
33	Electrical Line	CH:8+600 to CH:8+700_right	704856.019	948797.271	14.143
34	Electrical Line	CH:11+800 to CH:11+900_right	702856.615	951273.472	14.467
35	Electrical Line	CH:11+800 to CH:11+900_right	702855.691	951271.573	16.247
36	Electrical Line	CH:12+700 to CH:12+800_right	702235.076	951957.744	15.454
37	Electrical Line	CH:13+000 to CH:13+100_right	702052.420	952105.286	12.782
38	Electrical Line	CH:15+200 to CH:15+300_left	700554.355	953698.811	7.857
39	Electrical Line	CH:15+200 to CH:15+300_right	700555.739	953711.732	8.093
40	Electrical Line	CH:15+300 to CH:15+400_right	700470.327	953830.946	18.400
41	Electrical Line	CH:15+400 to CH:15+500_left	700396.732	953910.056	20.117
42	Electrical Line	CH:15+700 to CH:15+800_left	700264.528	954118.421	26.348
43	Electrical Line	CH:15+800 to CH:15+900_left	700194.720	954215.954	15.929
44	Electrical Line	CH:15+900 to CH:16+000_right	700129.984	954319.140	24.989
45	Electrical Line	CH:16+000 to CH:16+100_left	700097.091	954357.341	23.376
46	Electrical Line	CH:16+100 to CH:16+200_left	700035.712	954436.338	20.185
47	Electrical Line	CH:16+100 to CH:16+200_right	700024.988	954476.262	22.895
48	Electrical Line	CH:16+200 to CH:16+300_right	699962.633	954564.995	14.265
49	Electrical Line	CH:16+300 to CH:16+400_right	699889.284	954669.126	21.258
50	Electrical Line	CH:16+500 to CH:16+600_left	699812.415	954774.537	25.517

51	Electrical Line	CH:16+600 to CH:16+700_right	699749.631	954887.144	33.275
52	Electrical Line	CH:16+700 to CH:16+800_right	699685.230	954981.666	43.756
53	Electrical Line	CH:16+800 to CH:16+900_left	699613.749	955073.500	44.390
54	Electrical Line	CH:16+900 to CH:17+000_right	699567.620	955159.702	40.742
55	Electrical Line	CH:17+100 to CH:17+200_right	699464.277	955352.220	25.385
56	Electrical Line	CH:17+100 to CH:17+200_right	699480.305	955339.804	26.131
57	Electrical Line	CH:17+300 to CH:17+400_right	699391.386	955526.025	20.237
58	Electrical Line	CH:17+500 to CH:17+600_left	699316.273	955702.393	29.025
59	Electrical Line	CH:17+700 to CH:17+800_left	699270.366	955852.582	19.527
60	Electrical Line	CH:17+800 to CH:17+900_right	699232.657	956000.142	14.897
61	Electrical Line	CH:17+900 to CH:18+000_right	699219.074	956095.548	11.099
62	Electrical Line	CH:18+200 to CH:18+300_right	699132.735	956318.092	10.689
63	Electrical Line	CH:18+600 to CH:18+700_left	698987.551	956685.701	7.780
64	Electrical Line	CH:18+600 to CH:18+700_right	698974.448	956748.523	4.860
65	Electrical Line	CH:19+300 to CH:19+400_left	698736.375	957401.780	7.100
66	Electrical Line	CH:19+400 to CH:19+500_left	698715.762	957471.162	12.951
67	Electrical Line	CH:19+600 to CH:19+700_right	698637.222	957712.128	13.074
68	Electrical Line	CH:19+700 to CH:19+800_left	698592.691	957801.919	23.719
69	Electrical Line	CH:19+800 to CH:19+900_left	698577.992	957836.175	24.895
70	Electrical Line	CH:19+900 to CH:20+000_left	698562.367	957903.608	23.655
71	Electrical Line	CH:20+000 to CH:20+100_left	698517.461	958032.203	16.866
72	Electrical Line	CH:20+000 to CH:20+100_right	698530.016	958013.525	17.474
73	Electrical Line	CH:20+200 to CH:20+300_left	698450.570	958228.178	11.606
74	Electrical Line	CH:20+500 to CH:20+600_left	698349.209	958540.926	25.662
75	Electrical Line	CH:20+500 to CH:20+600_right	698356.180	958564.626	27.540
76	Electrical Line	CH:20+700 to CH:20+800_left	698312.795	958700.844	23.257
77	Electrical Line	CH:20+900 to CH:21+000_right	698261.779	958905.114	10.092
78	Electrical Line	CH:21+100 to CH:21+200_left	698178.581	959132.087	8.607
79	Electrical Line	CH:21+200 to CH:21+300_left	698157.500	959191.157	15.137
80	Electrical Line	CH:21+500 to CH:21+600_left	698080.361	959460.845	18.353
81	Electrical Line	CH:21+500 to CH:21+600_left	698070.664	959483.408	18.004
82	Electrical Line	CH:21+500 to CH:21+600_right	698078.546	959495.804	15.340
83	Electrical Line	CH:21+700 to CH:21+800_left	698024.478	959687.887	11.065
84	Electrical Line	CH:21+900 to CH:22+000_left	697978.548	959918.166	11.590
85	Electrical Line	CH:22+200 to CH:22+300_left	697967.334	960146.621	10.111
86	Electrical Line	CH:22+300 to CH:22+400_right	697967.410	960224.173	11.058
87	Electrical Line	CH:22+400 to CH:22+500_left	697938.800	960335.950	11.624
88	Electrical Line	CH:22+700 to CH:22+800_left	697954.572	960714.529	10.268
89	Electrical Line	CH:22+800 to CH:22+900_left	697942.610	960779.371	8.581
90	Electrical Line	CH:22+900 to CH:23+000_right	697962.605	960839.727	14.314
91	Electrical Line	CH:23+200 to CH:23+300_left	697941.224	961145.963	9.884
92	Electrical Line	CH:23+200 to CH:23+300_right	697948.724	961217.102	8.183
93	Electrical Line	CH:23+600 to CH:23+700_right	697953.523	961549.654	7.152
94	Electrical Line	CH:23+600 to CH:23+700_right	697949.234	961604.937	9.442
95	Electrical Line	CH:23+800 to CH:23+900_right	697943.384	961721.484	8.815
96	Electrical Line	CH:24+100 to CH:24+200_left	697923.604	962055.544	13.819
97	Electrical Line	CH:24+600 to CH:24+700_right	697940.843	962558.656	9.404
98	Electrical Line	CH:24+800 to CH:24+900_left	697953.166	962799.912	27.809
99	Electrical Line	CH:24+800 to CH:24+900_right	697975.488	962777.480	27.631
100	Electrical Line	CH:25+200 to CH:25+300_right	698050.794	963117.055	35.925
101	Electrical Line	CH:25+400 to CH:25+500_left	698099.521	963365.440	29.207
102	Electrical Line	CH:25+500 to CH:25+600_left	698127.753	963494.863	16.174

103	Electrical Line	CH:25+800 to CH:25+900_right	698195.993	963740.953	35.836
104	Electrical Line	CH:26+000 to CH:26+100_left	698243.422	963981.915	34.979
105	Electrical Line	CH:26+100 to CH:26+200_left	698264.512	964064.186	31.566
106	Electrical Line	CH:26+100 to CH:26+200_right	698259.955	964001.111	31.726
107	Electrical Line	CH:26+300 to CH:26+400_right	698328.707	964250.407	40.246
108	Electrical Line	CH:26+500 to CH:26+600_right	698354.373	964422.095	41.323
109	Electrical Line	CH:26+700 to CH:26+800_left	698388.806	964599.002	23.145
110	Electrical Line	CH:26+800 to CH:26+900_left	698418.334	964711.123	21.483
111	Electrical Line	CH:26+800 to CH:26+900_right	698437.541	964748.476	23.397
112	Electrical Line	CH:26+900 to CH:27+000_right	698435.885	964778.329	24.937
113	Electrical Line	CH:27+000 to CH:27+100_left	698458.428	964934.337	25.949
114	Electrical Line	CH:27+600 to CH:27+700_right	698592.345	965482.249	41.773
115	Electrical Line	CH:27+600 to CH:27+700_right	698604.024	965510.233	40.027
116	Electrical Line	CH:27+700 to CH:27+800_left	698599.375	965641.216	41.623
117	Electrical Line	CH:28+100 to CH:28+200_right	698689.791	965949.697	46.997
118	Electrical Line	CH:28+500 to CH:28+600_left	698751.110	966412.155	34.984
119	Electrical Line	CH:28+500 to CH:28+600_left	698758.473	966365.550	38.445
120	Electrical Line	CH:29+000 to CH:29+100_right	698878.887	966878.584	24.987
121	Electrical Line	CH:29+500 to CH:29+600_left	698896.266	967360.142	40.555
122	Electrical Line	CH:29+900 to CH:30+000_left	698871.037	967743.354	50.180
123	Electrical Line	CH:29+900 to CH:30+000_right	698889.451	967720.009	48.591
124	Electrical Line	CH:30+000 to CH:30+100_left	698846.082	967912.541	46.504
125	Electrical Line	CH:30+100 to CH:30+200_right	698869.928	967933.950	49.168
126	Electrical Line	CH:30+100 to CH:30+200_right	698883.406	967950.156	50.995
127	Electrical Line	CH:30+200 to CH:30+300_left	698851.263	968099.442	38.054
128	Electrical Line	CH:30+400 to CH:30+500_left	698835.067	968219.658	42.735
129	Electrical Line	CH:30+500 to CH:30+600_left	698817.558	968344.038	39.792
130	Electrical Line	CH:30+900 to CH:31+000_right	698814.320	968807.384	47.958
131	Electrical Line	CH:31+200 to CH:31+300_left	698785.591	969066.855	58.984
132	Electrical Line	CH:31+200 to CH:31+300_right	698806.452	969066.615	60.091
133	Electrical Line	CH:31+400 to CH:31+500_left	698776.036	969256.491	57.874
134	High Transmission Line	CH:31+600 to CH:31+700_right	698825.036	969482.217	54.629
135	Electrical Line	CH:31+900 to CH:32+000_right	698769.278	969771.307	54.059
136	Electrical Line	CH:32+500 to CH:32+600_left	698649.200	970388.626	51.453
137	Electrical Line	CH:32+900 to CH:33+000_right	698564.542	970715.677	55.554
138	Electrical Line	CH:33+000 to CH:33+100_left	698528.386	970790.982	60.319
139	Electrical Line	CH:33+200 to CH:33+300_right	698477.903	971000.158	52.066
140	Electrical Line	CH:33+400 to CH:33+500_left	698410.297	971195.754	55.093
141	Electrical Line	CH:33+500 to CH:33+600_left	698360.415	971343.229	69.317
142	Electrical Line	CH:33+700 to CH:33+800_left	698317.079	971490.838	73.436
143	Electrical Line	CH:33+900 to CH:34+000_left	698243.495	971666.983	79.326
144	Electrical Line	CH:34+100 to CH:34+200_left	698191.625	971892.144	63.487
145	Electrical Line	CH:34+200 to CH:34+300_left	698168.024	971974.316	55.214
146	Electrical Line	CH:34+900 to CH:35+000_right	697982.049	972653.896	99.123
147	Electrical Line	CH:35+100 to CH:35+200_left	697924.230	972801.472	99.504
148	Electrical Line	CH:35+800 to CH:35+900_right	697738.629	973486.586	86.685
149	Electrical Line	CH:36+600 to CH:36+700_left	697490.713	974244.363	61.065
150	Electrical Line	CH:37+000 to CH:37+100_left	697327.757	974668.653	93.872
151	Electrical Line	CH:37+800 to CH:37+900_right	696844.782	975318.641	54.872
152	Electrical Line	CH:38+300 to CH:38+400_right	696507.483	975632.156	66.049
153	Electrical Line	CH:38+900 to CH:39+000_left	696047.564	976056.819	34.333
154	Electrical Line	CH:39+000 to CH:39+100_left	695956.050	976109.477	31.245

155	Electrical Line	CH:39+200 to CH:39+300_left	695863.452	976228.280	42.763
156	Electrical Line	CH:39+400 to CH:39+500_left	695699.125	976371.505	51.873
157	Electrical Line	CH:39+500 to CH:39+600_right	695630.253	976432.486	46.279
158	Electrical Line	CH:39+600 to CH:39+700_right	695591.037	976499.049	46.085
159	Electrical Line	CH:39+800 to CH:39+900_left	695389.434	976595.175	57.614
160	Electrical Line	CH:40+400 to CH:40+500_right	694862.428	976877.980	55.505
161	Electrical Line	CH:41+300 to CH:41+400_right	693960.290	977168.620	22.563
162	Electrical Line	CH:41+300 to CH:41+400_right	693975.073	977169.103	25.999
163	Electrical Line	CH:41+400 to CH:41+500_right	693909.837	977202.740	21.366
164	Electrical Line	CH:41+500 to CH:41+600_left	693771.224	977220.235	28.748
165	Electrical Line	CH:41+900 to CH:42+000_left	693372.835	977355.537	44.602
166	High Transmission Line	CH:41+900 to CH:42+000_right	693382.141	977370.420	54.806
167	Electrical Line	CH:41+900 to CH:42+000_right	693367.782	977374.125	44.686
168	Electrical Line	CH:41+900 to CH:42+000_right	693434.583	977339.352	49.172
169	Electrical Line	CH:41+900 to CH:42+000_right	693402.801	977347.124	47.635
170	Electrical Line	CH:42+300 to CH:42+400_right	693016.019	977472.323	50.395
171	Electrical Line	CH:42+800 to CH:42+900_left	692596.702	977608.519	41.960
172	Electrical Line	CH:42+900 to CH:43+000_right	692494.852	977654.745	44.986
173	Electrical Line	CH:43+000 to CH:43+100_right	692350.736	977708.945	54.633
174	Electrical Line	CH:43+000 to CH:43+100_right	692375.032	977689.270	54.251
175	Electrical Line	CH:43+200 to CH:43+300_left	692184.487	977722.154	33.165
176	Electrical Line	CH:43+300 to CH:43+400_left	692088.417	977765.280	44.454
177	Electrical Line	CH:43+600 to CH:43+700_right	691751.679	977890.729	35.759
178	Electrical Line	CH:43+800 to CH:43+900_right	691611.847	977930.217	48.102
179	Electrical Line	CH:43+900 to CH:44+000_right	691460.886	977981.663	49.735
180	Electrical Line	CH:44+000 to CH:44+100_left	691436.516	977986.672	51.498
181	Electrical Line	CH:44+200 to CH:44+300_right	691258.460	978075.096	50.787
182	Electrical Line	CH:44+300 to CH:44+400_left	691084.425	978117.007	42.538
183	Electrical Line	CH:44+700 to CH:44+800_left	690723.854	978284.703	57.878
184	Electrical Line	CH:45+000 to CH:45+100_right	690485.498	978406.993	48.059
185	Electrical Line	CH:45+500 to CH:45+600_right	690028.954	978604.633	32.852
186	Electrical Line	CH:45+500 to CH:45+600_right	690020.681	978601.258	35.195
187	Electrical Line	CH:45+700 to CH:45+800_left	689833.595	978647.165	39.606
188	Electrical Line	CH:46+100 to CH:46+200_left	689433.093	978690.697	41.581
189	Electrical Line	CH:46+300 to CH:46+400_right	689234.915	978704.694	44.053
190	Electrical Line	CH:46+600 to CH:46+700_left	688936.493	978689.744	33.394
191	Electrical Line	CH:46+700 to CH:46+800_left	688803.525	978683.618	28.991
192	Electrical Line	CH:46+800 to CH:46+900_left	688717.424	978704.600	27.303
193	Electrical Line	CH:47+200 to CH:47+300_left	688358.964	978777.662	22.149
194	Electrical Line	CH:47+600 to CH:47+700_right	687972.743	978942.867	15.910
195	Electrical Line	CH:47+700 to CH:47+800_right	687893.044	978992.166	12.860
196	Electrical Line	CH:48+200 to CH:48+300_left	687463.468	979190.233	7.909
197	Electrical Line	CH:48+400 to CH:48+500_left	687293.152	979273.817	9.262
198	Electrical Line	CH:48+500 to CH:48+600_left	687180.844	979324.204	15.547
199	Electrical Line	CH:48+900 to CH:49+000_left	686816.693	979505.552	6.037
200	Electrical Line	CH:49+100 to CH:49+200_left	686644.760	979593.433	8.623
201	Electrical Line	CH:49+100 to CH:49+200_right	686630.019	979612.045	7.858
202	Electrical Line	CH:49+200 to CH:49+300_left	686568.169	979634.880	7.163
203	Electrical Line	CH:49+200 to CH:49+300_right	686541.490	979673.148	7.330
204	Electrical Line	CH:49+400 to CH:49+500_left	686368.726	979716.942	7.317
205	Electrical Line	CH:49+400 to CH:49+500_left	686389.822	979721.883	8.042
206	Electrical Line	CH:50+000 to CH:50+100_left	685846.093	980010.630	24.271

207	Electrical Line	CH:50+200 to CH:50+300_left	685679.509	980126.748	16.738
208	Electrical Line	CH:50+400 to CH:50+500_left	685491.741	980270.412	8.967
209	Electrical Line	CH:50+400 to CH:50+500_left	685557.366	980218.329	13.273
210	Electrical Line	CH:50+600 to CH:50+700_left	685343.260	980376.569	20.465
211	Electrical Line	CH:50+700 to CH:50+800_right	685310.035	980412.989	20.333
212	Electrical Line	CH:50+800 to CH:50+900_right	685170.550	980530.321	34.839
213	Electrical Line	CH:51+100 to CH:51+200_left	684996.470	980643.509	32.856
214	Electrical Line	CH:51+100 to CH:51+200_left	684967.683	980656.974	31.821
215	Electrical Line	CH:51+100 to CH:51+200_left	684946.875	980681.670	31.251
216	Electrical Line	CH:51+200 to CH:51+300_right	684889.416	980746.384	25.696
217	Electrical Line	CH:51+200 to CH:51+300_right	684916.305	980722.704	28.839
218	Electrical Line	CH:51+500 to CH:51+600_right	684626.467	980951.392	12.769
219	Electrical Line	CH:51+600 to CH:51+700_left	684546.959	981003.291	12.641
220	Electrical Line	CH:51+700 to CH:51+800_left	684475.139	981040.076	13.481
221	Electrical Line	CH:51+800 to CH:51+900_left	684391.754	981122.171	13.665
222	Electrical Line	CH:52+200 to CH:52+300_right	684077.744	981387.713	16.374
223	Electrical Line	CH:52+500 to CH:52+600_right	683833.891	981571.892	28.228
224	Electrical Line	CH:52+600 to CH:52+700_right	683769.980	981610.728	27.275
225	Electrical Line	CH:52+600 to CH:52+700_right	683752.309	981639.156	35.064
226	Electrical Line	CH:52+700 to CH:52+800_left	683663.454	981680.905	21.998
227	Electrical Line	CH:52+700 to CH:52+800_right	683705.511	981657.772	27.299
228	Electrical Line	CH:53+200 to CH:53+300_right	683320.947	981954.281	11.253
229	Electrical Line	CH:53+300 to CH:53+400_left	683210.019	982026.850	10.270
230	Electrical Line	CH:53+700 to CH:53+800_left	682912.290	982247.310	10.059
231	Electrical Line	CH:53+700 to CH:53+800_right	682914.597	982275.084	10.619
232	Electrical Line	CH:54+300 to CH:54+400_left	682496.174	982734.882	8.864
233	Electrical Line	CH:54+300 to CH:54+400_right	682534.348	982677.021	8.164
234	Electrical Line	CH:54+400 to CH:54+500_right	682493.584	982751.760	9.661
235	Electrical Line	CH:54+800 to CH:54+900_right	682377.160	983157.103	8.414
236	Electrical Line	CH:55+400 to CH:55+500_left	682216.145	983722.362	10.061
237	Electrical Line	CH:55+800 to CH:55+900_right	682106.789	984137.622	8.803
238	Electrical Line	CH:56+200 to CH:56+300_right	681989.219	984563.270	11.973
239	Electrical Line	CH:56+900 to CH:57+000_left	681879.675	985230.711	9.904
240	Electrical Line	CH:57+000 to CH:57+100_left	681894.977	985302.581	9.131
241	Electrical Line	CH:57+100 to CH:57+200_right	681934.077	985397.697	10.963
242	Electrical Line	CH:57+600 to CH:57+700_left	682153.702	985909.792	9.568
243	Electrical Line	CH:57+800 to CH:57+900_left	682199.562	986009.772	11.608
244	Electrical Line	CH:58+000 to CH:58+100_right	682296.719	986201.150	12.766
245	Electrical Line	CH:58+200 to CH:58+300_left	682350.007	986395.099	12.687
246	High Transmission Line	CH:58+400 to CH:58+500_left	682465.311	986641.418	18.919
247	Electrical Line	CH:58+500 to CH:58+600_right	682504.132	986661.074	14.433
248	Electrical Line	CH:58+800 to CH:58+900_left	682618.421	986960.368	15.411
249	Electrical Line	CH:58+900 to CH:59+000_right	682700.166	987089.437	14.419
250	Electrical Line	CH:58+900 to CH:59+000_right	682699.584	987087.372	16.669
251	Electrical Line	CH:59+100 to CH:59+200_left	682760.972	987266.706	17.641
252	Electrical Line	CH:59+300 to CH:59+400_right	682826.996	987383.044	16.184
253	Electrical Line	CH:59+400 to CH:59+500_left	682850.024	987494.834	14.758
254	Electrical Line	CH:59+700 to CH:59+800_left	682985.987	987822.119	24.911
255	Electrical Line	CH:59+700 to CH:59+800_right	682965.482	987753.693	21.520
256	Electrical Line	CH:59+700 to CH:59+800_right	683003.873	987815.500	22.651
257	Electrical Line	CH:59+800 to CH:59+900_left	683016.530	987891.713	26.527
258	Electrical Line	CH:59+900 to CH:60+000_left	683046.308	987949.174	20.219

259	Electrical Line	CH:60+100 to CH:60+200_left	683149.748	988190.279	18.492
260	Electrical Line	CH:60+400 to CH:60+500_left	683310.564	988437.935	20.067
261	Electrical Line	CH:60+500 to CH:60+600_left	683359.784	988547.270	21.247
262	Electrical Line	CH:60+600 to CH:60+700_left	683365.310	988551.040	19.004
263	High Transmission Line	CH:60+600 to CH:60+700_right	683405.313	988585.328	27.197
264	High Transmission Line	CH:60+800 to CH:60+900_left	683492.919	988805.602	23.331
265	Electrical Line	CH:61+100 to CH:61+200_left	683634.478	989032.257	21.487
266	Electrical Line	CH:61+300 to CH:61+400_left	683694.219	989163.974	19.762
267	Electrical Line	CH:61+800 to CH:61+900_left	683955.398	989638.797	34.045
268	Electrical Line	CH:61+900 to CH:62+000_right	684016.881	989706.210	33.679
269	Electrical Line	CH:62+000 to CH:62+100_left	684040.613	989785.645	31.139
270	Electrical Line	CH:62+000 to CH:62+100_left	684046.806	989801.502	32.433
271	Electrical Line	CH:62+100 to CH:62+200_right	684103.305	989940.902	26.663
272	Electrical Line	CH:62+500 to CH:62+600_left	684181.252	990291.377	28.068
273	Electrical Line	CH:62+500 to CH:62+600_left	684193.111	990303.842	27.999
274	Electrical Line	CH:62+500 to CH:62+600_right	684212.630	990328.530	27.684
275	Electrical Line	CH:62+600 to CH:62+700_right	684236.057	990401.681	28.672
276	Electrical Line	CH:62+600 to CH:62+700_right	684236.306	990434.274	27.140
277	Electrical Line	CH:62+700 to CH:62+800_left	684232.722	990473.138	28.907
278	Electrical Line	CH:62+900 to CH:63+000_left	684274.130	990654.078	32.288
279	High Transmission Line	CH:62+900 to CH:63+000_right	684290.970	990730.742	58.763
280	Electrical Line	CH:63+000 to CH:63+100_right	684299.020	990763.001	41.137
281	Electrical Line	CH:63+200 to CH:63+300_left	684281.994	991005.694	51.940
282	Electrical Line	CH:63+400 to CH:63+500_right	684391.151	991191.981	53.318
283	Electrical Line	CH:63+400 to CH:63+500_right	684381.012	991175.878	51.231
284	Electrical Line	CH:63+900 to CH:64+000_left	684450.488	991633.133	17.381
285	Electrical Line	CH:64+100 to CH:64+200_left	684516.476	991871.202	17.063
286	Electrical Line	CH:64+400 to CH:64+500_right	684619.833	992106.381	19.185
287	Electrical Line	CH:64+400 to CH:64+500_right	684646.881	992175.456	24.630
288	Electrical Line	CH:64+500 to CH:64+600_right	684664.724	992200.807	24.830
289	Electrical Line	CH:64+600 to CH:64+700_right	684693.576	992293.137	34.520
290	Electrical Line	CH:64+700 to CH:64+800_right	684751.096	992422.543	40.634
291	Electrical Line	CH:64+900 to CH:65+000_right	684839.423	992610.788	45.699
292	Electrical Line	CH:65+500 to CH:65+600_right	685029.573	993131.966	40.352
293	Electrical Line	CH:65+600 to CH:65+700_left	685069.815	993256.304	28.876
294	Electrical Line	CH:66+100 to CH:66+200_right	685219.472	993716.981	31.835
295	Electrical Line	CH:66+100 to CH:66+200_right	685246.920	993750.727	31.864
296	Electrical Line	CH:66+300 to CH:66+400_left	685255.836	993961.534	21.786
297	Electrical Line	CH:66+500 to CH:66+600_right	685280.007	994162.032	36.190
298	Electrical Line	CH:66+600 to CH:66+700_left	685276.432	994248.937	16.701
299	Electrical Line	CH:66+700 to CH:66+800_right	685301.107	994304.658	26.146
300	Electrical Line	CH:66+800 to CH:66+900_right	685289.817	994385.445	28.454
301	Electrical Line	CH:66+900 to CH:67+000_right	685282.321	994505.755	9.927
302	Electrical Line	CH:67+000 to CH:67+100_right	685290.205	994671.713	9.052
303	Electrical Line	CH:67+800 to CH:67+900_left	685101.342	995436.820	8.810
304	Electrical Line	CH:67+800 to CH:67+900_left	685117.999	995378.187	8.731
305	Electrical Line	CH:67+800 to CH:67+900_left	685107.318	995413.822	9.878
306	Electrical Line	CH:67+900 to CH:68+000_left	685079.277	995489.963	9.630
307	Electrical Line	CH:68+400 to CH:68+500_left	684944.614	996027.050	38.412
308	Electrical Line	CH:68+500 to CH:68+600_left	684926.995	996101.228	42.197
309	Electrical Line	CH:69+300 to CH:69+400_right	684740.914	996853.944	33.771
310	Electrical Line	CH:69+700 to CH:69+800_right	684645.478	997230.089	13.471

311	Electrical Line	CH:70+000 to CH:70+100_left	684553.838	997520.911	31.922
312	Electrical Line	CH:70+600 to CH:70+700_right	684424.178	998176.008	7.345
313	Electrical Line	CH:70+700 to CH:70+800_left	684387.565	998195.151	8.958
314	Electrical Line	CH:71+100 to CH:71+200_left	684279.572	998637.506	9.847
315	Electrical Line	CH:71+100 to CH:71+200_right	684294.242	998602.128	9.889
316	Electrical Line	CH:71+300 to CH:71+400_right	684254.311	998763.574	10.402
317	Electrical Line	CH:71+900 to CH:72+000_right	684106.546	999379.140	26.421
318	Electrical Line	CH:72+300 to CH:72+400_left	683976.607	999768.593	30.159
319	High Transmission Line	CH:72+500 to CH:72+600_right	683949.420	999960.735	42.768
320	Electrical Line	CH:72+900 to CH:73+000_right	683839.109	1000376.023	26.461
321	Electrical Line	CH:73+500 to CH:73+600_right	683745.913	1000956.652	18.530
322	Electrical Line	CH:73+600 to CH:73+700_right	683736.889	1001040.926	23.444
323	Electrical Line	CH:73+700 to CH:73+800_right	683741.559	1001146.505	32.861
324	Electrical Line	CH:74+400 to CH:74+500_right	683806.202	1001853.707	35.759
325	Electrical Line	CH:74+800 to CH:74+900_right	683857.459	1002183.729	38.722
326	Electrical Line	CH:75+200 to CH:75+300_left	683923.461	1002621.491	36.178
327	Electrical Line	CH:75+300 to CH:75+400_right	683946.363	1002710.702	33.694
328	Electrical Line	CH:75+500 to CH:75+600_right	683968.764	1002888.157	34.556
329	Electrical Line	CH:75+900 to CH:76+000_right	684045.846	1003283.605	36.562
330	Electrical Line	CH:76+300 to CH:76+400_left	684103.602	1003724.233	41.323
331	Electrical Line	CH:76+600 to CH:76+700_left	684148.107	1004009.728	34.839
332	Electrical Line	CH:76+900 to CH:77+000_left	684188.571	1004348.066	40.690
333	Electrical Line	CH:77+000 to CH:77+100_left	684207.839	1004398.920	36.888
334	Electrical Line	CH:77+300 to CH:77+400_left	684229.793	1004657.531	42.340
335	Electrical Line	CH:77+400 to CH:77+500_left	684235.579	1004764.482	32.761
336	Electrical Line	CH:77+600 to CH:77+700_left	684225.833	1004970.532	21.256
337	Electrical Line	CH:77+600 to CH:77+700_right	684227.906	1005029.582	21.073
338	Electrical Line	CH:78+300 to CH:78+400_left	684041.070	1005641.561	19.191
339	Electrical Line	CH:78+300 to CH:78+400_left	684032.978	1005660.906	20.626
340	Electrical Line	CH:78+400 to CH:78+500_right	683999.041	1005796.315	18.789
341	Electrical Line	CH:79+000 to CH:79+100_left	683709.752	1006304.478	42.062
342	Electrical Line	CH:79+400 to CH:79+500_right	683550.662	1006649.607	48.366
343	Electrical Line	CH:79+500 to CH:79+600_right	683467.043	1006784.686	47.034
344	Electrical Line	CH:79+700 to CH:79+800_left	683401.845	1006897.138	51.647
345	Electrical Line	CH:80+000 to CH:80+100_left	683241.762	1007206.194	43.380
346	Electrical Line	CH:80+300 to CH:80+400_right	683107.844	1007471.684	19.407
347	Electrical Line	CH:80+700 to CH:80+800_left	682917.276	1007808.716	21.667
348	Electrical Line	CH:80+700 to CH:80+800_right	682972.601	1007768.547	30.667
349	Electrical Line	CH:81+100 to CH:81+200_right	682741.939	1008175.292	19.389
350	Electrical Line	CH:81+800 to CH:81+900_right	682475.478	1008823.608	24.408
351	Electrical Line	CH:82+100 to CH:82+200_right	682369.404	1009103.394	23.313
352	Electrical Line	CH:82+500 to CH:82+600_left	682213.681	1009401.514	16.638
353	Electrical Line	CH:82+600 to CH:82+700_left	682144.610	1009540.287	14.327
354	Electrical Line	CH:82+800 to CH:82+900_right	682080.514	1009771.337	16.434
355	Electrical Line	CH:83+600 to CH:83+700_left	681796.655	1010454.773	22.560
356	Electrical Line	CH:83+600 to CH:83+700_right	681779.251	1010512.595	27.640
357	Electrical Line	CH:83+800 to CH:83+900_right	681723.559	1010650.190	36.882
358	Electrical Line	CH:84+200 to CH:84+300_left	681553.889	1011052.107	25.203
359	Electrical Line	CH:84+600 to CH:84+700_right	681431.435	1011387.831	23.451
360	Electrical Line	CH:84+700 to CH:84+800_left	681399.232	1011444.570	20.704
361	Electrical Line	CH:84+700 to CH:84+800_right	681409.987	1011542.616	30.052
362	Electrical Line	CH:84+800 to CH:84+900_left	681354.936	1011536.649	18.234

363	Electrical Line	CH:84+800 to CH:84+900_right	681354.509	1011575.147	18.343
364	Electrical Line	CH:85+200 to CH:85+300_right	681193.117	1011946.853	28.017
365	Electrical Line	CH:85+300 to CH:85+400_right	681122.591	1012083.859	24.337
366	Electrical Line	CH:85+600 to CH:85+700_right	681000.723	1012288.198	26.075
367	Electrical Line	CH:85+600 to CH:85+700_right	680985.809	1012317.401	25.822
368	Electrical Line	CH:85+700 to CH:85+800_left	680933.532	1012382.893	26.808
369	Electrical Line	CH:85+900 to CH:86+000_left	680790.933	1012575.297	30.611
370	Electrical Line	CH:86+100 to CH:86+200_left	680702.055	1012724.606	24.929
371	Electrical Line	CH:86+500 to CH:86+600_left	680489.256	1013045.146	34.404
372	Electrical Line	CH:87+200 to CH:87+300_right	680184.879	1013677.245	37.042
373	Electrical Line	CH:87+800 to CH:87+900_left	680011.258	1014250.689	37.166
374	Electrical Line	CH:87+800 to CH:87+900_left	680027.160	1014230.190	36.389
375	Electrical Line	CH:88+200 to CH:88+300_right	680009.063	1014607.769	35.450
376	Electrical Line	CH:88+200 to CH:88+300_right	680024.210	1014640.964	35.665
377	Electrical Line	CH:88+400 to CH:88+500_right	680024.021	1014837.350	41.182
378	Electrical Line	CH:88+600 to CH:88+700_right	680022.505	1015016.093	29.581
379	Electrical Line	CH:90+200 to CH:90+300_right	680249.628	1016623.805	21.639
380	Electrical Line	CH:90+600 to CH:90+700_right	680299.755	1017035.302	26.483
381	High Transmission Line	CH:90+800 to CH:90+900_left	680297.794	1017275.940	30.017
382	Electrical Line	CH:91+000 to CH:91+100_right	680350.759	1017443.235	21.530
383	Electrical Line	CH:91+100 to CH:91+200_left	680360.730	1017555.705	12.999
384	Electrical Line	CH:92+900 to CH:93+000_left	680551.816	1019282.940	13.159
385	Electrical Line	CH:94+300 to CH:94+400_left	680607.526	1020667.617	11.886
386	Electrical Line	CH:94+600 to CH:94+700_right	680657.196	1021022.923	11.892
387	Electrical Line	CH:95+100 to CH:95+200_right	680621.724	1021462.630	13.396
388	Electrical Line	CH:95+300 to CH:95+400_left	680534.107	1021724.542	11.459
389	Electrical Line	CH:95+900 to CH:96+000_right	680407.615	1022286.701	12.419
390	High Transmission Line	CH:96+000 to CH:96+100_right	680414.938	1022423.686	18.360
391	Electrical Line	CH:97+100 to CH:97+200_right	680113.306	1023440.335	32.666
392	Electrical Line	CH:97+500 to CH:97+600_left	680012.002	1023810.218	31.314
393	Electrical Line	CH:97+700 to CH:97+800_left	679960.781	1024060.927	26.236
394	Electrical Line	CH:98+000 to CH:98+100_left	679917.056	1024305.057	53.915
395	Electrical Line	CH:98+400 to CH:98+500_right	679842.213	1024720.806	61.543
396	Electrical Line	CH:98+900 to CH:99+000_right	679763.773	1025164.181	63.469
397	Electrical Line	CH:99+000 to CH:99+100_right	679755.940	1025331.423	46.054
398	Electrical Line	CH:99+500 to CH:99+600_left	679720.994	1025830.218	24.270
399	Electrical Line	CH:105+300 to CH:105+400_left	680422.994	1031567.664	11.703
400	Electrical Line	CH:107+200 to CH:107+300_left	680549.717	1033490.692	9.951
401	Electrical Line	CH:107+200 to CH:107+300_left	680531.977	1033438.500	10.368
402	Electrical Line	CH:108+800 to CH:108+900_right	680383.445	1035078.648	20.093
403	Electrical Line	CH:108+900 to CH:109+000_right	680370.246	1035150.167	19.753
404	Electrical Line	CH:109+000 to CH:109+100_right	680340.395	1035194.464	17.036
405	Electrical Line	CH:109+600 to CH:109+700_left	680126.158	1035825.324	11.299
406	Electrical Line	CH:109+600 to CH:109+700_right	680159.977	1035821.121	11.452
407	Electrical Line	CH:109+800 to CH:109+900_left	680092.448	1035970.814	12.774
408	Electrical Line	CH:110+500 to CH:110+600_left	679893.265	1036709.768	11.970
409	Electrical Line	CH:110+500 to CH:110+600_left	679883.804	1036708.293	9.063
410	Electrical Line	CH:113+000 to CH:113+100_left	679101.440	1039043.853	14.808
411	Electrical Line	CH:113+000 to CH:113+100_right	679126.079	1039021.882	14.625
412	Electrical Line	CH:113+400 to CH:113+500_right	678997.112	1039416.488	8.661
413	Electrical Line	CH:115+200 to CH:115+300_left	678470.815	1041104.326	11.919
414	Electrical Line	CH:115+200 to CH:115+300_left	678514.220	1041153.202	9.712

415	Electrical Line	CH:117+100 to CH:117+200_right	678130.441	1043056.511	25.939
416	Electrical Line	CH:117+300 to CH:117+400_right	678093.231	1043189.672	27.641
417	Electrical Line	CH:117+400 to CH:117+500_right	678064.160	1043285.090	24.260
418	Electrical Line	CH:117+500 to CH:117+600_right	678049.873	1043356.724	27.341
419	Electrical Line	CH:117+500 to CH:117+600_right	678042.730	1043414.227	22.067
420	Electrical Line	CH:117+600 to CH:117+700_right	678047.597	1043453.110	18.153
421	Electrical Line	CH:117+600 to CH:117+700_right	678048.126	1043497.388	16.108
422	Electrical Line	CH:118+000 to CH:118+100_left	677911.563	1043898.259	14.798
423	Electrical Line	CH:118+500 to CH:118+600_left	677790.279	1044363.688	29.905
424	Electrical Line	CH:119+200 to CH:119+300_right	677507.054	1045009.493	23.705
425	Electrical Line	CH:119+400 to CH:119+500_left	677408.747	1045127.945	33.959
426	Electrical Line	CH:119+400 to CH:119+500_right	677452.742	1045142.523	37.032
427	Electrical Line	CH:119+600 to CH:119+700_right	677302.762	1045382.371	31.318
428	Electrical Line	CH:119+700 to CH:119+800_left	677242.482	1045458.317	22.936
429	Electrical Line	CH:119+700 to CH:119+800_right	677298.732	1045414.678	29.339
430	Electrical Line	CH:119+700 to CH:119+800_right	677280.967	1045437.782	25.923
431	Electrical Line	CH:119+800 to CH:119+900_left	677230.008	1045502.438	20.859
432	Electrical Line	CH:119+900 to CH:120+000_right	677158.966	1045658.668	20.342
433	Electrical Line	CH:120+400 to CH:120+500_left	676926.110	1046065.820	48.393
434	Electrical Line	CH:120+900 to CH:121+000_right	676695.063	1046516.056	43.329
435	Electrical Line	CH:121+600 to CH:121+700_right	676317.344	1047139.654	43.752
436	Electrical Line	CH:122+200 to CH:122+300_left	676044.608	1047576.823	21.636
437	Electrical Line	CH:122+800 to CH:122+900_right	675730.568	1048144.730	33.688
438	Electrical Line	CH:123+100 to CH:123+200_left	675562.161	1048390.821	36.908
439	Electrical Line	CH:123+100 to CH:123+200_right	675583.265	1048372.939	33.880
440	Electrical Line	CH:124+200 to CH:124+300_right	675020.801	1049327.060	44.842
441	Electrical Line	CH:124+300 to CH:124+400_left	674948.326	1049377.630	30.467
442	Electrical Line	CH:124+400 to CH:124+500_right	674905.186	1049475.738	22.518
443	Electrical Line	CH:124+500 to CH:124+600_left	674843.462	1049531.698	25.297
444	Electrical Line	CH:124+600 to CH:124+700_right	674739.982	1049662.858	14.240
445	Electrical Line	CH:124+600 to CH:124+700_right	674747.062	1049644.725	12.932
446	Electrical Line	CH:124+900 to CH:125+000_right	674540.365	1049840.348	18.675
447	Electrical Line	CH:125+000 to CH:125+100_right	674446.401	1049924.758	22.709
448	Electrical Line	CH:125+000 to CH:125+100_right	674470.696	1049900.738	21.556
449	Electrical Line	CH:125+300 to CH:125+400_left	674217.751	1050084.375	35.124
450	Electrical Line	CH:125+700 to CH:125+800_right	673923.298	1050315.594	36.574
451	Electrical Line	CH:125+800 to CH:125+900_left	673796.625	1050399.620	20.791
452	Electrical Line	CH:126+500 to CH:126+600_right	673255.513	1050826.928	14.312
453	Electrical Line	CH:126+700 to CH:126+800_left	673101.343	1050913.559	9.863
454	Electrical Line	CH:126+700 to CH:126+800_left	673102.503	1050916.784	12.018
455	Electrical Line	CH:127+400 to CH:127+500_left	672526.830	1051370.090	10.245
456	Electrical Line	CH:127+600 to CH:127+700_right	672390.534	1051519.358	5.268
457	Electrical Line	CH:128+500 to CH:128+600_left	671843.125	1052247.208	7.267
458	Electrical Line	CH:128+700 to CH:128+800_right	671796.846	1052404.297	11.989
459	Electrical Line	CH:129+200 to CH:129+300_right	671641.088	1052839.882	4.949
460	Electrical Line	CH:129+400 to CH:129+500_right	671575.625	1053028.701	6.764
461	Electrical Line	CH:129+600 to CH:129+700_left	671450.863	1053237.771	7.129
462	Electrical Line	CH:129+600 to CH:129+700_left	671447.669	1053252.642	6.167
463	Electrical Line	CH:129+600 to CH:129+700_right	671491.605	1053224.147	7.670
464	Electrical Line	CH:129+600 to CH:129+700_right	671476.281	1053231.790	9.504
465	High Transmission Line	CH:129+700 to CH:129+800_left	671397.967	1053346.777	26.935
466	Electrical Line	CH:130+000 to CH:130+100_right	671343.399	1053597.969	9.849

467	Electrical Line	CH:130+600 to CH:130+700_left	671055.687	1054135.299	15.317
468	Electrical Line	CH:131+800 to CH:131+900_left	670253.208	1055092.532	5.801
469	Electrical Line	CH:131+900 to CH:132+000_left	670230.392	1055119.020	8.583
470	Electrical Line	CH:131+900 to CH:132+000_left	670225.064	1055119.042	6.545
471	High Transmission Line	CH:132+000 to CH:132+100_right	670177.974	1055204.258	13.685
472	High Transmission Line	CH:132+300 to CH:132+400_left	669918.858	1055457.517	16.650
473	Electrical Line	CH:132+500 to CH:132+600_right	669816.239	1055631.054	5.537
474	Electrical Line	CH:132+900 to CH:133+000_right	669546.024	1055904.461	8.578
475	Electrical Line	CH:132+900 to CH:133+000_right	669615.171	1055884.952	13.720
476	Electrical Line	CH:132+900 to CH:133+000_right	669569.429	1055871.973	6.643
477	Electrical Line	CH:133+000 to CH:133+100_left	669486.289	1055958.334	11.307
478	Electrical Line	CH:133+100 to CH:133+200_right	669459.938	1056026.083	18.885
479	Electrical Line	CH:133+300 to CH:133+400_right	669325.550	1056237.324	23.481
480	Electrical Line	CH:133+500 to CH:133+600_right	669229.679	1056448.628	13.516
481	High Transmission Line	CH:133+700 to CH:133+800_right	669210.617	1056576.932	10.440
482	Electrical Line	CH:133+800 to CH:133+900_right	669111.430	1056722.264	15.910
483	Electrical Line	CH:133+900 to CH:134+000_left	669088.160	1056766.926	24.327
484	Electrical Line	CH:134+200 to CH:134+300_left	668993.289	1057049.210	21.158
485	High Transmission Line	CH:134+300 to CH:134+400_left	668982.576	1057128.987	20.137
486	Electrical Line	CH:134+300 to CH:134+400_left	668984.682	1057144.105	10.568
487	Electrical Line	CH:135+000 to CH:135+100_left	668914.338	1057843.993	7.152
488	High Transmission Line	CH:135+200 to CH:135+300_right	668925.695	1058016.596	7.467
489	Electrical Line	CH:136+400 to CH:136+500_left	668834.274	1059305.337	5.984
490	Electrical Line	CH:136+500 to CH:136+600_left	668822.526	1059383.073	10.126
491	Electrical Line	CH:136+600 to CH:136+700_left	668814.998	1059435.533	9.056
492	High Transmission Line	CH:136+600 to CH:136+700_left	668808.217	1059417.989	18.797
493	Electrical Line	CH:136+600 to CH:136+700_right	668834.235	1059468.374	12.191
494	Electrical Line	CH:136+700 to CH:136+800_left	668819.794	1059524.839	20.938
495	Electrical Line	CH:136+700 to CH:136+800_right	668828.299	1059550.706	24.901
496	Electrical Line	CH:136+700 to CH:136+800_right	668833.127	1059541.744	25.880
497	Electrical Line	CH:136+800 to CH:136+900_right	668821.926	1059663.600	25.228
498	Electrical Line	CH:136+900 to CH:137+000_right	668823.134	1059732.233	13.022
499	Electrical Line	CH:136+900 to CH:137+000_right	668820.738	1059710.174	17.304
500	Electrical Line	CH:137+000 to CH:137+100_left	668811.642	1059831.801	7.231
501	Electrical Line	CH:137+000 to CH:137+100_left	668808.493	1059889.808	9.728
502	Electrical Line	CH:137+500 to CH:137+600_left	668761.221	1060317.297	32.239
503	Electrical Line	CH:137+500 to CH:137+600_right	668759.083	1060342.266	31.501
504	Electrical Line	CH:137+500 to CH:137+600_right	668766.506	1060308.188	29.508
505	Electrical Line	CH:137+700 to CH:137+800_left	668715.638	1060575.356	23.298
506	Electrical Line	CH:137+800 to CH:137+900_left	668713.308	1060622.417	32.362
507	Electrical Line	CH:137+800 to CH:137+900_right	668725.112	1060685.746	26.986
508	Electrical Line	CH:137+800 to CH:137+900_right	668739.998	1060627.492	32.059
509	Electrical Line	CH:137+900 to CH:138+000_left	668709.143	1060742.684	15.485
510	Electrical Line	CH:138+200 to CH:138+300_left	668727.972	1061034.014	22.522
511	Electrical Line	CH:138+200 to CH:138+300_right	668735.732	1061018.995	22.053
512	Electrical Line	CH:138+400 to CH:138+500_right	668776.785	1061223.779	7.867
513	High Transmission Line	CH:138+500 to CH:138+600_right	668817.527	1061290.510	11.100
514	Electrical Line	CH:138+800 to CH:138+900_left	668970.309	1061641.141	7.902
515	Electrical Line	CH:139+100 to CH:139+200_left	669100.172	1061859.793	8.167
516	Electrical Line	CH:139+100 to CH:139+200_right	669128.121	1061859.500	8.094
517	Electrical Line	CH:139+400 to CH:139+500_right	669284.913	1062124.900	8.298
518	Electrical Line	CH:139+500 to CH:139+600_left	669338.106	1062231.468	9.916

519	Electrical Line	CH:139+500 to CH:139+600_right	669304.621	1062154.154	9.370
520	Electrical Line	CH:139+600 to CH:139+700_right	669377.125	1062267.247	10.185
521	Electrical Line	CH:139+700 to CH:139+800_left	669418.086	1062335.908	8.972
522	Electrical Line	CH:139+700 to CH:139+800_left	669436.773	1062365.391	9.783
523	Electrical Line	CH:139+800 to CH:139+900_left	669508.476	1062474.254	8.898
524	Electrical Line	CH:139+900 to CH:140+000_left	669567.022	1062569.372	8.944
525	Electrical Line	CH:139+900 to CH:140+000_right	669565.781	1062555.227	7.931
526	Electrical Line	CH:140+000 to CH:140+100_left	669579.405	1062583.796	9.116
527	Electrical Line	CH:140+200 to CH:140+300_right	669736.934	1062804.083	9.023
528	Electrical Line	CH:140+300 to CH:140+400_left	669781.951	1062904.869	15.105
529	Electrical Line	CH:140+700 to CH:140+800_right	669984.306	1063203.641	19.721
530	Electrical Line	CH:140+800 to CH:140+900_right	670046.177	1063304.589	11.592
531	Electrical Line	CH:141+300 to CH:141+400_left	670308.625	1063735.553	14.832
532	Electrical Line	CH:141+300 to CH:141+400_right	670318.778	1063710.081	12.480
533	Electrical Line	CH:141+500 to CH:141+600_left	670385.917	1063853.946	25.663
534	Electrical Line	CH:141+700 to CH:141+800_left	670520.646	1064066.747	30.962
535	Electrical Line	CH:141+800 to CH:141+900_left	670549.093	1064117.383	27.013
536	Electrical Line	CH:141+800 to CH:141+900_right	670578.401	1064128.624	30.257
537	Electrical Line	CH:141+900 to CH:142+000_left	670603.804	1064196.100	31.580
538	Electrical Line	CH:142+400 to CH:142+500_left	670904.263	1064661.898	10.374
539	Electrical Line	CH:142+400 to CH:142+500_right	670902.671	1064638.474	9.827
540	Electrical Line	CH:142+800 to CH:142+900_left	671098.331	1064951.636	11.015
541	Electrical Line	CH:143+000 to CH:143+100_right	671238.626	1065143.779	7.076
542	Electrical Line	CH:143+200 to CH:143+300_left	671311.232	1065276.298	9.503
543	Electrical Line	CH:143+200 to CH:143+300_left	671345.353	1065340.583	8.572
544	Electrical Line	CH:144+000 to CH:144+100_left	671732.822	1065960.649	10.525
545	Electrical Line	CH:144+000 to CH:144+100_right	671767.938	1065974.234	10.939
546	Electrical Line	CH:144+100 to CH:144+200_right	671829.655	1066060.235	10.472
547	Electrical Line	CH:144+300 to CH:144+400_right	671895.002	1066212.865	12.213
548	Electrical Line	CH:144+600 to CH:144+700_left	672003.744	1066546.100	10.532
549	Electrical Line	CH:144+600 to CH:144+700_right	672028.267	1066473.085	8.379
550	Electrical Line	CH:144+900 to CH:145+000_left	672088.114	1066847.846	12.095
551	Electrical Line	CH:144+900 to CH:145+000_right	672085.714	1066775.484	16.003
552	Electrical Line	CH:145+100 to CH:145+200_right	672135.347	1067010.288	15.924
553	Electrical Line	CH:145+600 to CH:145+700_left	672212.141	1067486.956	13.581
554	Electrical Line	CH:145+600 to CH:145+700_right	672234.835	1067522.331	10.241
555	Electrical Line	CH:146+000 to CH:146+100_left	672276.350	1067856.742	21.091
556	Electrical Line	CH:146+100 to CH:146+200_left	672301.583	1067975.056	15.333
557	Electrical Line	CH:146+100 to CH:146+200_right	672319.008	1067986.413	13.630
558	Electrical Line	CH:146+200 to CH:146+300_right	672336.690	1068114.833	10.577
559	Electrical Line	CH:146+300 to CH:146+400_left	672335.550	1068160.718	10.591
560	Electrical Line	CH:146+700 to CH:146+800_left	672407.641	1068553.246	11.400
561	Electrical Line	CH:146+700 to CH:146+800_right	672420.172	1068567.978	12.009
562	Electrical Line	CH:146+900 to CH:147+000_left	672442.048	1068813.943	14.442
563	Electrical Line	CH:147+000 to CH:147+100_left	672449.956	1068864.799	11.049
564	Electrical Line	CH:147+500 to CH:147+600_left	672440.737	1069401.798	18.116
565	Electrical Line	CH:147+500 to CH:147+600_left	672443.894	1069362.079	15.888
566	High Transmission Line	CH:148+000 to CH:148+100_right	672386.193	1069906.798	51.901
567	Electrical Line	CH:148+200 to CH:148+300_left	672306.329	1070055.475	43.431
568	High Transmission Line	CH:148+300 to CH:148+400_left	672235.530	1070158.760	44.325
569	Electrical Line	CH:148+500 to CH:148+600_left	672177.430	1070367.202	40.177
570	Electrical Line	CH:148+700 to CH:148+800_left	672083.448	1070549.181	36.290

571	Electrical Line	CH:148+800 to CH:148+900_left	672065.199	1070610.619	42.327
572	High Transmission Line	CH:149+000 to CH:149+100_left	671932.025	1070765.954	37.567
573	Electrical Line	CH:149+100 to CH:149+200_right	671966.674	1070845.290	35.402
574	Electrical Line	CH:149+600 to CH:149+700_left	671702.696	1071359.405	48.209
575	Electrical Line	CH:150+000 to CH:150+100_right	671560.573	1071715.794	51.533
576	Electrical Line	CH:150+000 to CH:150+100_right	671601.723	1071725.472	53.695
577	Electrical Line	CH:150+400 to CH:150+500_left	671388.420	1072022.870	79.667
578	Electrical Line	CH:150+800 to CH:150+900_right	671232.047	1072394.211	60.208
579	Electrical Line	CH:151+000 to CH:151+100_left	671109.356	1072626.221	48.943
580	Electrical Line	CH:151+200 to CH:151+300_right	671045.257	1072789.604	59.286
581	Electrical Line	CH:151+400 to CH:151+500_left	670954.500	1072943.943	66.477
582	High Transmission Line	CH:151+500 to CH:151+600_left	670900.228	1073080.258	64.942
583	Electrical Line	CH:151+500 to CH:151+600_left	670905.553	1073072.225	60.116
584	Electrical Line	CH:151+500 to CH:151+600_right	670907.855	1073067.783	59.808
585	Electrical Line	CH:151+700 to CH:151+800_right	670829.760	1073240.842	36.732
586	Electrical Line	CH:151+700 to CH:151+800_right	670830.953	1073243.995	37.136
587	Electrical Line	CH:152+200 to CH:152+300_right	670607.278	1073706.374	35.535
588	Electrical Line	CH:152+900 to CH:153+000_right	670307.542	1074360.460	38.609
589	Electrical Line	CH:153+600 to CH:153+700_right	670040.511	1074918.737	45.930
590	Electrical Line	CH:153+900 to CH:154+000_left	669870.952	1075254.622	28.429
591	Electrical Line	CH:154+700 to CH:154+800_right	669561.322	1075926.033	28.348
592	Electrical Line	CH:155+000 to CH:155+100_right	669454.560	1076223.895	27.151
593	High Transmission Line	CH:155+100 to CH:155+200_right	669435.883	1076309.120	37.070
594	Electrical Line	CH:155+200 to CH:155+300_right	669395.751	1076418.332	30.152
595	Electrical Line	CH:155+500 to CH:155+600_left	669285.375	1076695.712	35.727
596	Electrical Line	CH:155+600 to CH:155+700_left	669271.150	1076809.691	40.071
597	Electrical Line	CH:155+900 to CH:156+000_left	669171.092	1077096.496	32.313
598	Electrical Line	CH:157+000 to CH:157+100_right	668873.843	1078124.346	45.221
599	Electrical Line	CH:157+700 to CH:157+800_left	668650.383	1078800.972	34.797
600	Electrical Line	CH:157+900 to CH:158+000_left	668600.369	1078960.695	44.316
601	Electrical Line	CH:158+100 to CH:158+200_right	668543.121	1079170.109	61.608
602	High Transmission Line	CH:158+600 to CH:158+700_right	668395.436	1079708.712	35.016
603	Electrical Line	CH:159+100 to CH:159+200_right	668177.855	1080177.460	20.233
604	Electrical Line	CH:159+400 to CH:159+500_right	668054.478	1080356.540	16.567
605	Electrical Line	CH:159+600 to CH:159+700_right	667909.746	1080522.350	17.772
606	Electrical Line	CH:160+100 to CH:160+200_left	667499.885	1080850.961	26.768
607	Electrical Line	CH:160+900 to CH:161+000_left	666834.531	1081356.087	14.058
608	Electrical Line	CH:161+400 to CH:161+500_right	666463.278	1081693.246	14.734
609	Electrical Line	CH:161+500 to CH:161+600_left	666391.734	1081747.331	13.749
610	Electrical Line	CH:162+800 to CH:162+900_left	665738.934	1082851.910	21.521
611	Electrical Line	CH:162+900 to CH:163+000_left	665694.495	1082940.906	22.150
612	Electrical Line	CH:163+000 to CH:163+100_left	665691.221	1082976.170	22.489
613	Electrical Line	CH:163+000 to CH:163+100_right	665682.816	1083032.823	21.667
614	Electrical Line	CH:163+200 to CH:163+300_right	665611.778	1083239.612	25.060
615	Electrical Line	CH:164+500 to CH:164+600_right	665175.868	1084422.604	41.511
616	Electrical Line	CH:165+400 to CH:165+500_right	664862.312	1085296.364	18.188
617	Electrical Line	CH:165+600 to CH:165+700_left	664788.101	1085458.546	19.171
618	Electrical Line	CH:165+600 to CH:165+700_right	664810.967	1085445.793	20.046
619	Electrical Line	CH:165+900 to CH:166+000_left	664681.455	1085746.148	11.973
620	Electrical Line	CH:166+100 to CH:166+200_right	664609.930	1085944.794	9.443
621	Electrical Line	CH:166+200 to CH:166+300_left	664533.891	1086040.642	17.541
622	Electrical Line	CH:166+300 to CH:166+400_left	664527.365	1086064.153	17.941

623	Electrical Line	CH:166+900 to CH:167+000_left	664145.828	1086596.503	12.495
624	Electrical Line	CH:166+900 to CH:167+000_right	664172.010	1086600.780	13.582
625	Electrical Line	CH:168+000 to CH:168+100_left	663489.452	1087501.371	7.294
626	Electrical Line	CH:168+900 to CH:169+000_left	662963.699	1088239.791	9.592
627	High Transmission Line	CH:169+100 to CH:169+200_right	662891.771	1088369.716	17.148
628	Electrical Line	CH:169+200 to CH:169+300_right	662818.296	1088493.154	8.194
629	Electrical Line	CH:169+800 to CH:169+900_left	662541.927	1088999.865	8.497
630	Electrical Line	CH:170+000 to CH:170+100_right	662490.701	1089164.737	13.369
631	Electrical Line	CH:170+700 to CH:170+800_left	662228.055	1089816.305	21.041
632	Electrical Line	CH:170+800 to CH:170+900_left	662186.647	1089930.773	42.887
633	Electrical Line	CH:171+400 to CH:171+500_left	661986.515	1090470.945	10.837
634	Electrical Line	CH:171+400 to CH:171+500_right	661982.920	1090519.615	11.419
635	Electrical Line	CH:171+400 to CH:171+500_right	661990.844	1090501.631	12.999
636	Electrical Line	CH:171+500 to CH:171+600_right	661974.990	1090538.073	12.919
637	Electrical Line	CH:171+900 to CH:172+000_right	661832.901	1090917.433	10.899
638	Electrical Line	CH:172+600 to CH:172+700_right	661581.066	1091605.418	11.572
639	Electrical Line	CH:172+900 to CH:173+000_right	661474.303	1091894.956	13.104
640	Electrical Line	CH:173+000 to CH:173+100_right	661434.628	1092022.357	14.724
641	Electrical Line	CH:173+200 to CH:173+300_left	661370.130	1092134.171	24.048
642	Electrical Line	CH:173+500 to CH:173+600_right	661274.515	1092463.775	66.167
643	Electrical Line	CH:173+600 to CH:173+700_right	661222.328	1092588.548	73.485
644	Electrical Line	CH:174+000 to CH:174+100_right	661091.228	1092916.999	22.112
645	Electrical Line	CH:174+000 to CH:174+100_right	661094.216	1092925.225	27.221
646	Electrical Line	CH:174+200 to CH:174+300_left	661014.246	1093100.593	21.827
647	Electrical Line	CH:174+200 to CH:174+300_right	661078.812	1093092.464	26.327
648	Electrical Line	CH:174+300 to CH:174+400_left	660981.293	1093180.456	35.228
649	Electrical Line	CH:174+500 to CH:174+600_left	660889.889	1093394.931	11.782
650	Electrical Line	CH:174+600 to CH:174+700_right	660895.824	1093473.884	12.301
651	Electrical Line	CH:175+100 to CH:175+200_left	660640.657	1093905.250	11.141
652	High Transmission Line	CH:175+200 to CH:175+300_left	660533.566	1094011.241	18.055
653	Electrical Line	CH:175+300 to CH:175+400_right	660534.171	1094136.765	9.169
654	Electrical Line	CH:175+400 to CH:175+500_left	660462.838	1094132.881	9.625
655	Electrical Line	CH:175+500 to CH:175+600_left	660398.911	1094260.975	13.349
656	Electrical Line	CH:175+500 to CH:175+600_left	660420.977	1094204.161	11.573
657	Electrical Line	CH:175+500 to CH:175+600_right	660386.842	1094286.954	13.885
658	Electrical Line	CH:175+900 to CH:176+000_left	660156.136	1094518.766	17.282
659	Electrical Line	CH:176+200 to CH:176+300_right	659944.219	1094710.391	25.928
660	Electrical Line	CH:176+400 to CH:176+500_left	659777.548	1094825.996	13.580
661	Electrical Line	CH:176+500 to CH:176+600_left	659647.100	1094944.227	24.415
662	Electrical Line	CH:177+000 to CH:177+100_left	659262.636	1095255.231	11.931
663	Electrical Line	CH:177+800 to CH:177+900_right	658634.707	1095788.511	9.402
664	Electrical Line	CH:177+900 to CH:178+000_right	658568.386	1095846.959	12.853
665	Electrical Line	CH:177+900 to CH:178+000_right	658556.721	1095841.785	13.490
666	High Transmission Line	CH:178+000 to CH:178+100_left	658537.937	1095840.048	35.768
667	Electrical Line	CH:178+300 to CH:178+400_right	658213.733	1096020.876	12.667
668	Electrical Line	CH:179+100 to CH:179+200_right	657497.536	1096248.374	27.409
669	High Transmission Line	CH:180+000 to CH:180+100_right	656640.886	1096524.559	51.677
670	Electrical Line	CH:182+800 to CH:182+900_right	654081.221	1097598.394	10.711
671	Electrical Line	CH:182+900 to CH:183+000_left	654037.490	1097623.106	8.918
672	Electrical Line	CH:182+900 to CH:183+000_left	654007.387	1097598.612	9.131
673	Electrical Line	CH:182+900 to CH:183+000_right	654038.308	1097639.459	9.766
674	Electrical Line	CH:183+000 to CH:183+100_left	653948.640	1097703.377	8.745

675	High Transmission Line	CH:187+700 to CH:187+800_left	650472.922	1100703.428	8.915
676	Electrical Line	CH:188+400 to CH:188+500_left	650061.327	1101327.273	15.284
677	Electrical Line	CH:188+400 to CH:188+500_right	650092.264	1101348.735	11.058
678	High Transmission Line	CH:189+500 to CH:189+600_left	649288.615	1102048.802	10.807
679	High Transmission Line	CH:189+900 to CH:190+000_left	649056.099	1102465.534	7.297
680	High Transmission Line	CH:190+100 to CH:190+200_left	649002.484	1102643.167	10.204
681	High Transmission Line	CH:190+100 to CH:190+200_right	649022.384	1102637.851	10.450
682	High Transmission Line	CH:191+200 to CH:191+300_left	648942.592	1103757.400	19.884
683	High Transmission Line	CH:191+500 to CH:191+600_left	648971.859	1104036.305	19.697
684	High Transmission Line	CH:191+800 to CH:191+900_right	649216.467	1104208.078	10.342
685	High Transmission Line	CH:193+600 to CH:193+700_left	649965.557	1105859.774	5.197
686	Electrical Line	CH:193+900 to CH:194+000_left	650116.268	1106188.270	8.353
687	High Transmission Line	CH:197+100 to CH:197+200_left	651796.781	1108799.497	46.933
688	Electrical Line	CH:197+100 to CH:197+200_right	651902.529	1108802.558	42.839
689	Electrical Line	CH:197+300 to CH:197+400_left	651925.210	1108964.336	10.655
690	Electrical Line	CH:197+400 to CH:197+500_left	651965.204	1109084.856	7.306
691	Electrical Line	CH:198+400 to CH:198+500_right	652206.692	1109992.734	7.825
692	Electrical Line	CH:198+900 to CH:199+000_left	652310.525	1110498.232	7.342
693	High Transmission Line	CH:199+500 to CH:199+600_left	652358.500	1111080.086	7.326
694	Electrical Line	CH:199+700 to CH:199+800_left	652519.382	1111322.390	6.702
695	Electrical Line	CH:199+700 to CH:199+800_left	652522.352	1111339.139	8.547
696	Electrical Line	CH:200+300 to CH:200+400_left	652659.664	1111861.348	12.860
697	Electrical Line	CH:200+700 to CH:200+800_left	652730.163	1112243.910	14.058
698	Electrical Line	CH:200+700 to CH:200+800_right	652750.713	1112268.654	15.115
699	Electrical Line	CH:200+700 to CH:200+800_right	652750.490	1112273.624	16.187
700	Electrical Line	CH:200+800 to CH:200+900_right	652757.353	1112365.610	19.607
701	Electrical Line	CH:201+000 to CH:201+100_left	652784.598	1112557.378	18.808
702	Electrical Line	CH:201+000 to CH:201+100_right	652799.555	1112614.365	15.356
703	Electrical Line	CH:201+000 to CH:201+100_right	652794.000	1112576.188	17.054
704	Electrical Line	CH:201+100 to CH:201+200_right	652810.524	1112646.961	19.293
705	Electrical Line	CH:201+400 to CH:201+500_left	652864.819	1112998.957	20.276
706	Electrical Line	CH:201+500 to CH:201+600_right	652876.204	1113058.013	20.933
707	Electrical Line	CH:201+700 to CH:201+800_right	652924.667	1113272.591	19.539
708	Electrical Line	CH:203+000 to CH:203+100_left	653123.061	1114521.107	25.944
709	Electrical Line	CH:203+000 to CH:203+100_left	653117.140	1114531.691	26.968
710	Electrical Line	CH:203+300 to CH:203+400_left	653175.853	1114837.295	30.187
711	High Transmission Line	CH:203+300 to CH:203+400_left	653100.544	1114809.498	32.005
712	Electrical Line	CH:203+600 to CH:203+700_right	653222.949	1115086.883	30.923
713	Electrical Line	CH:203+700 to CH:203+800_left	653232.932	1115224.642	20.801
714	Electrical Line	CH:203+800 to CH:203+900_right	653281.371	1115300.767	20.154
715	Electrical Line	CH:204+000 to CH:204+100_left	653299.081	1115538.703	30.362
716	Electrical Line	CH:204+000 to CH:204+100_left	653291.647	1115571.870	29.051
717	Electrical Line	CH:204+200 to CH:204+300_left	653319.492	1115708.561	28.273
718	Electrical Line	CH:204+700 to CH:204+800_left	653369.562	1116218.191	18.967
719	Electrical Line	CH:204+900 to CH:205+000_left	653363.862	1116438.990	13.467
720	Electrical Line	CH:205+000 to CH:205+100_left	653361.102	1116468.728	13.350
721	Electrical Line	CH:205+100 to CH:205+200_right	653344.914	1116655.685	24.733
722	Electrical Line	CH:205+700 to CH:205+800_right	653223.753	1117173.610	16.394
723	High Transmission Line	CH:206+300 to CH:206+400_right	653089.876	1117813.983	15.131
724	Electrical Line	CH:207+200 to CH:207+300_left	652419.153	1118448.506	11.043
725	Electrical Line	CH:207+400 to CH:207+500_right	652287.220	1118658.298	14.569
726	Electrical Line	CH:207+500 to CH:207+600_left	652229.660	1118679.390	13.763

727	Electrical Line	CH:207+500 to CH:207+600_right	652222.311	1118702.888	15.679
728	Electrical Line	CH:207+600 to CH:207+700_left	652148.015	1118780.356	15.281
729	Electrical Line	CH:207+600 to CH:207+700_left	652154.632	1118765.312	16.530
730	Electrical Line	CH:207+900 to CH:208+000_right	651958.376	1119015.022	11.192
731	Electrical Line	CH:208+000 to CH:208+100_left	651892.954	1119067.220	11.948
732	High Transmission Line	CH:208+300 to CH:208+400_right	651746.705	1119275.926	16.397
733	Electrical Line	CH:208+500 to CH:208+600_left	651557.862	1119476.016	12.396
734	Electrical Line	CH:208+600 to CH:208+700_right	651528.904	1119521.284	11.587
735	Electrical Line	CH:208+700 to CH:208+800_right	651465.563	1119602.757	9.685
736	Electrical Line	CH:208+700 to CH:208+800_right	651449.033	1119624.322	9.443
737	Electrical Line	CH:208+800 to CH:208+900_right	651397.350	1119713.425	8.856
738	Electrical Line	CH:208+900 to CH:209+000_right	651362.558	1119757.944	7.659
739	Electrical Line	CH:209+100 to CH:209+200_left	651228.297	1119921.446	7.196
740	High Transmission Line	CH:209+400 to CH:209+500_left	651046.484	1120136.795	14.817
741	Electrical Line	CH:210+000 to CH:210+100_left	650942.172	1120798.457	9.395
742	Electrical Line	CH:210+000 to CH:210+100_left	650950.585	1120760.231	12.233
743	Electrical Line	CH:210+000 to CH:210+100_left	650938.581	1120796.194	11.498
744	Electrical Line	CH:210+200 to CH:210+300_right	650963.928	1120971.598	13.616
745	Electrical Line	CH:210+300 to CH:210+400_right	650966.584	1121100.106	13.191
746	Electrical Line	CH:210+300 to CH:210+400_right	650961.424	1121051.745	14.074
747	Electrical Line	CH:210+500 to CH:210+600_right	651001.930	1121301.830	11.133
748	Electrical Line	CH:210+600 to CH:210+700_right	651011.416	1121341.331	11.708
749	Electrical Line	CH:210+600 to CH:210+700_right	651039.604	1121424.661	11.215
750	Electrical Line	CH:213+300 to CH:213+400_right	651242.304	1124082.214	17.314
751	Electrical Line	CH:213+600 to CH:213+700_left	651226.930	1124333.310	14.372
752	Electrical Line	CH:213+700 to CH:213+800_right	651252.840	1124435.711	11.650
753	Electrical Line	CH:213+800 to CH:213+900_right	651250.292	1124514.029	11.225
754	Electrical Line	CH:213+900 to CH:214+000_right	651225.556	1124671.401	15.895
755	Electrical Line	CH:214+000 to CH:214+100_right	651209.352	1124780.601	21.668
756	Electrical Line	CH:214+100 to CH:214+200_right	651198.727	1124828.481	21.773
757	Electrical Line	CH:214+100 to CH:214+200_right	651193.833	1124873.638	21.281
758	High Transmission Line	CH:214+200 to CH:214+300_right	651189.849	1124943.444	32.407
759	High Transmission Line	CH:214+200 to CH:214+300_right	651188.160	1124954.289	32.325
760	High Transmission Line	CH:214+800 to CH:214+900_right	651181.455	1125547.133	22.161
761	Electrical Line	CH:214+800 to CH:214+900_right	651068.391	1125557.452	30.209
762	Electrical Line	CH:215+600 to CH:215+700_right	650770.846	1126230.175	20.589
763	Electrical Line	CH:215+800 to CH:215+900_left	650629.896	1126419.772	19.837
764	Electrical Line	CH:216+000 to CH:216+100_left	650530.510	1126548.421	14.094
765	Electrical Line	CH:216+000 to CH:216+100_right	650522.381	1126605.061	13.627
766	Electrical Line	CH:216+200 to CH:216+300_right	650427.125	1126767.373	8.975
767	Electrical Line	CH:216+200 to CH:216+300_right	650422.101	1126789.527	7.954
768	Electrical Line	CH:216+500 to CH:216+600_right	650239.134	1127055.254	14.510
769	Electrical Line	CH:216+800 to CH:216+900_left	650093.046	1127236.746	7.892
770	Electrical Line	CH:217+400 to CH:217+500_left	649693.826	1127681.646	13.091
771	Electrical Line	CH:217+400 to CH:217+500_left	649641.340	1127722.747	15.186
772	Electrical Line	CH:217+500 to CH:217+600_left	649566.460	1127773.607	17.075
773	Electrical Line	CH:217+600 to CH:217+700_left	649482.700	1127831.279	14.398
774	Electrical Line	CH:217+700 to CH:217+800_right	649421.854	1127910.298	11.869
775	Electrical Line	CH:217+700 to CH:217+800_right	649476.776	1127882.895	14.495
776	Electrical Line	CH:218+100 to CH:218+200_right	649124.816	1128138.709	12.445
777	Electrical Line	CH:218+800 to CH:218+900_left	648557.253	1128505.454	18.426
778	Electrical Line	CH:218+900 to CH:219+000_right	648503.314	1128548.670	25.110

779	Electrical Line	CH:219+000 to CH:219+100_left	648393.874	1128599.907	26.256
780	Electrical Line	CH:219+200 to CH:219+300_left	648248.038	1128703.783	16.394
781	Electrical Line	CH:219+300 to CH:219+400_left	648088.432	1128813.490	16.914
782	Electrical Line	CH:219+400 to CH:219+500_left	648032.231	1128839.777	15.918
783	Electrical Line	CH:220+000 to CH:220+100_left	647554.712	1129149.106	23.001
784	Electrical Line	CH:220+100 to CH:220+200_left	647417.098	1129238.763	30.688
785	Electrical Line	CH:220+300 to CH:220+400_right	647337.220	1129314.403	33.284
786	Electrical Line	CH:220+300 to CH:220+400_right	647263.098	1129376.423	33.145
787	Electrical Line	CH:220+600 to CH:220+700_right	647016.756	1129524.364	18.198
788	Electrical Line	CH:220+700 to CH:220+800_left	646956.532	1129545.734	15.595
789	Electrical Line	CH:221+000 to CH:221+100_right	646731.332	1129718.316	19.167
790	Electrical Line	CH:221+900 to CH:222+000_right	645955.647	1130256.760	9.771
791	Electrical Line	CH:222+100 to CH:222+200_left	645830.667	1130331.763	10.668
792	Electrical Line	CH:222+500 to CH:222+600_left	645472.939	1130550.726	12.773
793	Electrical Line	CH:222+500 to CH:222+600_right	645475.719	1130591.162	11.047
794	Electrical Line	CH:223+200 to CH:223+300_left	644862.265	1131000.335	9.491
795	Electrical Line	CH:223+500 to CH:223+600_left	644613.174	1131161.490	9.504
796	Electrical Line	CH:223+800 to CH:223+900_right	644417.383	1131312.782	10.494
797	Electrical Line	CH:223+800 to CH:223+900_right	644393.430	1131327.224	9.272
798	Electrical Line	CH:223+900 to CH:224+000_right	644321.095	1131373.979	10.425
799	Electrical Line	CH:224+300 to CH:224+400_right	643997.902	1131604.090	7.732
800	Electrical Line	CH:224+600 to CH:224+700_left	643726.513	1131741.731	12.744
801	Electrical Line	CH:225+300 to CH:225+400_left	643240.003	1132231.933	12.390
802	Electrical Line	CH:225+300 to CH:225+400_left	643223.022	1132249.854	12.085
803	Electrical Line	CH:225+400 to CH:225+500_right	643156.869	1132337.836	9.259
804	Electrical Line	CH:225+500 to CH:225+600_right	643139.082	1132398.844	12.216
805	Electrical Line	CH:226+000 to CH:226+100_left	642861.888	1132776.225	11.968
806	Electrical Line	CH:226+100 to CH:226+200_right	642806.697	1132940.019	12.765
807	Electrical Line	CH:226+200 to CH:226+300_left	642771.691	1132964.614	13.904
808	Electrical Line	CH:226+200 to CH:226+300_left	642754.148	1132977.680	12.706
809	High Transmission Line	CH:226+600 to CH:226+700_right	642638.580	1133397.313	16.214
810	Electrical Line	CH:227+700 to CH:227+800_right	642275.144	1134375.851	9.700
811	Electrical Line	CH:227+800 to CH:227+900_right	642232.462	1134525.777	10.776
812	Electrical Line	CH:228+000 to CH:228+100_left	642110.072	1134711.234	12.447
813	Electrical Line	CH:228+100 to CH:228+200_left	642085.248	1134821.486	13.309
814	Electrical Line	CH:228+300 to CH:228+400_left	642048.204	1134934.308	12.781
815	Electrical Line	CH:228+700 to CH:228+800_right	641888.149	1135384.084	13.588
816	Electrical Line	CH:229+100 to CH:229+200_right	641790.739	1135718.700	13.787
817	Electrical Line	CH:229+300 to CH:229+400_left	641703.804	1135879.193	18.974
818	Electrical Line	CH:229+600 to CH:229+700_left	641617.343	1136157.740	13.573
819	Electrical Line	CH:230+000 to CH:230+100_left	641491.513	1136618.726	23.135
820	Electrical Line	CH:230+300 to CH:230+400_right	641467.214	1136859.894	17.968
821	Electrical Line	CH:230+600 to CH:230+700_left	641388.917	1137143.965	12.898
822	Electrical Line	CH:231+100 to CH:231+200_left	641293.111	1137644.910	15.328
823	Electrical Line	CH:231+100 to CH:231+200_left	641284.324	1137662.295	16.405
824	Electrical Line	CH:231+300 to CH:231+400_left	641252.403	1137812.733	13.900
825	Electrical Line	CH:231+300 to CH:231+400_left	641234.453	1137832.164	14.207
826	Electrical Line	CH:231+400 to CH:231+500_left	641196.453	1137953.177	18.472
827	Electrical Line	CH:231+400 to CH:231+500_right	641220.059	1137990.770	22.144
828	Electrical Line	CH:231+500 to CH:231+600_left	641187.304	1138095.617	22.214
829	Electrical Line	CH:232+000 to CH:232+100_left	641086.012	1138583.006	21.667
830	Electrical Line	CH:232+000 to CH:232+100_left	641088.942	1138554.624	22.197

831	Electrical Line	CH:232+200 to CH:232+300_right	641067.529	1138723.658	21.211
832	Electrical Line	CH:232+900 to CH:233+000_right	640904.564	1139474.100	31.186
833	Electrical Line	CH:233+200 to CH:233+300_right	640865.676	1139681.409	34.584
834	Electrical Line	CH:233+200 to CH:233+300_right	640869.437	1139687.156	31.851
835	Electrical Line	CH:233+300 to CH:233+400_right	640812.331	1139797.984	28.901
836	Electrical Line	CH:233+300 to CH:233+400_right	640810.290	1139860.068	25.194
837	Electrical Line	CH:234+100 to CH:234+200_left	640417.234	1140516.762	19.249
838	Electrical Line	CH:234+300 to CH:234+400_right	640275.870	1140695.641	26.030
839	Electrical Line	CH:234+400 to CH:234+500_right	640216.570	1140754.121	22.210
840	Electrical Line	CH:234+500 to CH:234+600_left	640152.627	1140775.787	18.017
841	Electrical Line	CH:234+600 to CH:234+700_right	640045.094	1140895.606	15.955
842	Electrical Line	CH:234+700 to CH:234+800_right	640019.000	1140921.191	16.486
843	Electrical Line	CH:234+900 to CH:235+000_right	639861.118	1141068.567	22.110
844	Electrical Line	CH:235+500 to CH:235+600_left	639408.402	1141450.520	19.504
845	Electrical Line	CH:236+400 to CH:236+500_left	638727.345	1142059.628	11.181
846	Electrical Line	CH:236+800 to CH:236+900_left	638403.087	1142366.409	12.894
847	Electrical Line	CH:238+000 to CH:238+100_left	637852.728	1143416.382	13.996
848	Electrical Line	CH:238+200 to CH:238+300_left	637800.745	1143546.127	15.468
849	Electrical Line	CH:238+500 to CH:238+600_left	637693.449	1143864.082	6.877
850	Electrical Line	CH:238+500 to CH:238+600_left	637677.387	1143895.260	6.166
851	Electrical Line	CH:238+600 to CH:238+700_left	637644.895	1143990.253	11.981
852	Electrical Line	CH:238+900 to CH:239+000_left	637575.577	1144218.039	8.212
853	Electrical Line	CH:239+100 to CH:239+200_right	637537.249	1144388.898	6.158
854	Electrical Line	CH:239+700 to CH:239+800_left	637305.352	1144994.799	7.504
855	Electrical Line	CH:239+700 to CH:239+800_right	637332.337	1144949.963	6.455
856	Electrical Line	CH:240+300 to CH:240+400_right	637136.104	1145515.363	12.285
857	Electrical Line	CH:240+300 to CH:240+400_right	637107.293	1145591.867	12.584
858	Electrical Line	CH:240+600 to CH:240+700_right	637029.915	1145816.757	8.782
859	Electrical Line	CH:240+700 to CH:240+800_left	636957.125	1145932.953	6.368
860	Electrical Line	CH:240+800 to CH:240+900_right	636959.660	1146028.666	11.008
861	Electrical Line	CH:240+900 to CH:241+000_left	636887.785	1146125.821	5.394
862	Electrical Line	CH:241+200 to CH:241+300_left	636811.758	1146423.108	7.978
863	Electrical Line	CH:241+400 to CH:241+500_left	636752.005	1146597.600	4.461
864	Electrical Line	CH:241+800 to CH:241+900_right	636656.391	1146938.927	6.254
865	Electrical Line	CH:243+000 to CH:243+100_right	636026.979	1147997.757	10.442
866	Electrical Line	CH:243+200 to CH:243+300_right	635894.565	1148130.725	6.951
867	Electrical Line	CH:243+800 to CH:243+900_left	635446.377	1148564.631	10.603
868	Electrical Line	CH:245+500 to CH:245+600_left	634245.002	1149776.769	10.551
869	High Transmission Line	CH:245+600 to CH:245+700_left	634208.251	1149812.122	16.826
870	Electrical Line	CH:245+800 to CH:245+900_right	634076.234	1149981.075	8.467
871	Electrical Line	CH:246+000 to CH:246+100_left	633887.516	1150148.906	10.105
872	Electrical Line	CH:246+100 to CH:246+200_right	633878.561	1150175.845	9.545
873	Electrical Line	CH:246+400 to CH:246+500_left	633662.754	1150381.195	6.967
874	Electrical Line	CH:246+400 to CH:246+500_left	633644.786	1150425.109	8.860
875	Electrical Line	CH:246+400 to CH:246+500_left	633622.349	1150443.927	9.252
876	Electrical Line	CH:246+700 to CH:246+800_right	633467.897	1150643.245	8.246
877	Electrical Line	CH:246+800 to CH:246+900_left	633346.937	1150747.955	9.913
878	Electrical Line	CH:246+900 to CH:247+000_left	633312.366	1150769.971	11.098
879	Electrical Line	CH:247+200 to CH:247+300_right	633096.620	1151026.731	8.846
880	Electrical Line	CH:247+200 to CH:247+300_right	633091.698	1151048.056	6.651
881	Electrical Line	CH:247+300 to CH:247+400_right	633057.034	1151078.541	6.058
882	Electrical Line	CH:247+500 to CH:247+600_left	632874.474	1151263.513	7.396

883	Electrical Line	CH:247+500 to CH:247+600_left	632891.263	1151245.995	9.765
884	Electrical Line	CH:247+500 to CH:247+600_right	632871.850	1151280.083	8.409
885	Electrical Line	CH:247+600 to CH:247+700_left	632789.483	1151340.630	7.115
886	Electrical Line	CH:247+700 to CH:247+800_left	632715.934	1151402.686	5.252
887	Electrical Line	CH:247+900 to CH:248+000_left	632613.047	1151544.570	6.694
888	Electrical Line	CH:248+000 to CH:248+100_right	632534.239	1151640.737	7.271
889	Electrical Line	CH:248+100 to CH:248+200_left	632508.168	1151660.470	5.525
890	Electrical Line	CH:248+500 to CH:248+600_right	632243.737	1151957.722	9.590
891	Electrical Line	CH:248+600 to CH:248+700_left	632124.620	1152079.864	7.867
892	Electrical Line	CH:249+000 to CH:249+100_left	631922.625	1152336.886	6.053
893	Electrical Line	CH:249+100 to CH:249+200_right	631900.009	1152433.035	5.461
894	Electrical Line	CH:249+100 to CH:249+200_right	631891.902	1152466.915	4.833
895	Electrical Line	CH:249+900 to CH:250+000_right	631541.682	1153235.182	8.978
896	Electrical Line	CH:250+000 to CH:250+100_right	631523.988	1153306.916	8.878
897	Electrical Line	CH:250+100 to CH:250+200_right	631508.515	1153371.112	11.187
898	Electrical Line	CH:250+200 to CH:250+300_right	631496.341	1153450.208	12.042
899	Electrical Line	CH:250+300 to CH:250+400_right	631469.085	1153599.170	11.486
900	Electrical Line	CH:250+800 to CH:250+900_left	631433.815	1154046.285	8.945
901	High Transmission Line	CH:250+800 to CH:250+900_right	631442.626	1154032.002	8.277
902	Electrical Line	CH:251+000 to CH:251+100_left	631449.547	1154267.729	9.604
903	Electrical Line	CH:251+200 to CH:251+300_right	631480.879	1154464.642	9.311
904	Electrical Line	CH:251+300 to CH:251+400_left	631502.070	1154620.275	16.105
905	Electrical Line	CH:251+500 to CH:251+600_left	631534.511	1154739.934	14.719
906	Electrical Line	CH:251+500 to CH:251+600_right	631555.636	1154816.987	13.959
907	Electrical Line	CH:251+700 to CH:251+800_left	631572.305	1154920.571	14.695
908	Electrical Line	CH:251+700 to CH:251+800_right	631610.218	1154972.048	15.056
909	Electrical Line	CH:251+700 to CH:251+800_right	631586.884	1154929.331	15.898
910	Electrical Line	CH:251+800 to CH:251+900_right	631632.090	1155082.945	13.947
911	Electrical Line	CH:252+500 to CH:252+600_right	631796.361	1155690.510	7.775
912	Electrical Line	CH:252+500 to CH:252+600_right	631815.702	1155742.822	7.401
913	Electrical Line	CH:252+600 to CH:252+700_right	631833.881	1155804.570	6.594
914	Electrical Line	CH:252+700 to CH:252+800_left	631846.652	1155913.071	7.918
915	Electrical Line	CH:252+800 to CH:252+900_right	631897.703	1156055.776	11.637
916	Electrical Line	CH:252+800 to CH:252+900_right	631888.741	1156006.885	9.734
917	Electrical Line	CH:253+000 to CH:253+100_right	631949.458	1156236.784	9.773
918	Electrical Line	CH:253+800 to CH:253+900_left	632147.432	1157019.811	7.313
919	High Transmission Line	CH:253+900 to CH:254+000_left	632176.143	1157080.865	11.219
920	Electrical Line	CH:253+900 to CH:254+000_left	632167.694	1157041.248	11.812
921	Electrical Line	CH:254+400 to CH:254+500_right	632317.566	1157546.909	19.759
922	Electrical Line	CH:254+500 to CH:254+600_left	632328.836	1157628.052	19.282
923	Electrical Line	CH:254+600 to CH:254+700_left	632367.015	1157763.237	15.969
924	Electrical Line	CH:254+900 to CH:255+000_right	632455.035	1158072.504	9.601
925	Electrical Line	CH:255+000 to CH:255+100_left	632475.345	1158179.492	8.986
926	Electrical Line	CH:255+100 to CH:255+200_right	632514.175	1158279.195	7.431
927	Electrical Line	CH:255+100 to CH:255+200_right	632510.509	1158234.725	8.408
928	Electrical Line	CH:255+100 to CH:255+200_right	632512.870	1158253.855	7.217
929	Electrical Line	CH:255+300 to CH:255+400_right	632563.230	1158469.776	8.313
930	Electrical Line	CH:256+000 to CH:256+100_right	632571.295	1159086.928	7.120
931	Electrical Line	CH:256+100 to CH:256+200_right	632563.101	1159203.026	8.568
932	Electrical Line	CH:256+500 to CH:256+600_right	632415.097	1159623.572	8.792
933	Electrical Line	CH:256+500 to CH:256+600_right	632407.200	1159636.881	7.181
934	Electrical Line	CH:256+700 to CH:256+800_left	632328.416	1159776.560	8.622

935	Electrical Line	CH:256+700 to CH:256+800_right	632343.325	1159761.818	6.700
936	Electrical Line	CH:256+800 to CH:256+900_left	632279.531	1159855.284	8.488
937	Electrical Line	CH:257+000 to CH:257+100_right	632154.951	1160034.714	16.167
938	Electrical Line	CH:257+100 to CH:257+200_right	632101.779	1160095.490	17.762
939	Electrical Line	CH:257+100 to CH:257+200_right	632107.247	1160091.251	17.773
940	Electrical Line	CH:257+300 to CH:257+400_right	631983.695	1160242.483	17.007
941	Electrical Line	CH:257+400 to CH:257+500_left	631873.923	1160322.481	16.122
942	Electrical Line	CH:257+500 to CH:257+600_left	631853.687	1160375.586	13.655
943	Electrical Line	CH:257+500 to CH:257+600_left	631830.568	1160407.574	12.646
944	Electrical Line	CH:257+500 to CH:257+600_left	631806.128	1160421.113	9.048
945	Electrical Line	CH:257+500 to CH:257+600_right	631847.569	1160394.870	14.453
946	Electrical Line	CH:257+600 to CH:257+700_left	631745.732	1160535.648	9.668
947	Electrical Line	CH:257+700 to CH:257+800_left	631719.830	1160594.897	11.162
948	Electrical Line	CH:258+000 to CH:258+100_right	631682.544	1160847.498	19.191
949	Electrical Line	CH:258+000 to CH:258+100_right	631681.441	1160837.658	19.773
950	Electrical Line	CH:258+100 to CH:258+200_right	631678.642	1160953.416	18.732
951	Electrical Line	CH:258+200 to CH:258+300_left	631696.840	1161079.842	12.393
952	Electrical Line	CH:258+200 to CH:258+300_left	631669.197	1161058.437	12.467
953	Electrical Line	CH:258+300 to CH:258+400_right	631744.065	1161214.066	13.946
954	Electrical Line	CH:258+400 to CH:258+500_left	631742.817	1161235.942	13.359
955	Electrical Line	CH:258+500 to CH:258+600_left	631771.906	1161363.446	12.345
956	Electrical Line	CH:258+500 to CH:258+600_right	631772.061	1161320.829	13.610
957	Electrical Line	CH:258+600 to CH:258+700_right	631816.689	1161495.000	8.060
958	Electrical Line	CH:258+900 to CH:259+000_left	631873.873	1161766.332	10.219
959	Electrical Line	CH:259+000 to CH:259+100_right	631916.962	1161870.624	13.473
960	Electrical Line	CH:259+700 to CH:259+800_right	632084.089	1162534.964	6.539
961	Electrical Line	CH:259+800 to CH:259+900_left	632115.018	1162631.139	6.315
962	Electrical Line	CH:260+300 to CH:260+400_right	632255.627	1163142.985	11.143
963	Electrical Line	CH:260+300 to CH:260+400_right	632259.655	1163058.687	14.874
964	Electrical Line	CH:260+300 to CH:260+400_right	632254.389	1163082.659	10.513
965	Electrical Line	CH:260+500 to CH:260+600_right	632241.249	1163287.994	12.254
966	Electrical Line	CH:260+800 to CH:260+900_right	632189.797	1163538.933	20.208
967	Electrical Line	CH:262+100 to CH:262+200_right	632293.662	1164912.457	14.640
968	Electrical Line	CH:262+400 to CH:262+500_right	632270.345	1165221.748	10.295
969	Electrical Line	CH:262+900 to CH:263+000_left	632211.762	1165632.805	12.920
970	Electrical Line	CH:263+300 to CH:263+400_left	632122.184	1166021.544	9.807
971	High Transmission Line	CH:263+400 to CH:263+500_right	632154.443	1166135.672	24.732
972	Electrical Line	CH:263+800 to CH:263+900_right	632060.430	1166591.228	8.967
973	Electrical Line	CH:263+900 to CH:264+000_right	632026.205	1166695.294	10.333
974	Electrical Line	CH:264+000 to CH:264+100_left	631966.244	1166767.416	9.137
975	Electrical Line	CH:264+200 to CH:264+300_left	631912.792	1166948.786	7.594
976	Electrical Line	CH:264+700 to CH:264+800_right	631681.660	1167404.470	11.793
977	Electrical Line	CH:264+700 to CH:264+800_right	631725.150	1167345.786	12.532
978	Electrical Line	CH:264+800 to CH:264+900_right	631660.164	1167438.977	11.841
979	Electrical Line	CH:264+900 to CH:265+000_left	631604.535	1167504.520	12.727
980	Electrical Line	CH:265+000 to CH:265+100_left	631525.292	1167618.780	9.835
981	Electrical Line	CH:265+100 to CH:265+200_left	631450.390	1167714.536	10.644
982	Electrical Line	CH:265+200 to CH:265+300_left	631399.603	1167781.224	11.220
983	Electrical Line	CH:265+300 to CH:265+400_left	631327.889	1167879.368	12.323
984	Electrical Line	CH:265+300 to CH:265+400_right	631364.804	1167845.927	11.290
985	Electrical Line	CH:265+300 to CH:265+400_right	631335.549	1167874.207	11.424
986	Electrical Line	CH:265+500 to CH:265+600_left	631192.770	1168035.932	9.404

987	Electrical Line	CH:265+900 to CH:266+000_left	630991.180	1168329.448	10.571
988	Electrical Line	CH:266+200 to CH:266+300_left	630799.061	1168570.841	13.705
989	Electrical Line	CH:266+300 to CH:266+400_right	630741.874	1168669.826	11.950
990	Electrical Line	CH:266+300 to CH:266+400_right	630716.798	1168678.406	12.914
991	Electrical Line	CH:266+400 to CH:266+500_left	630684.220	1168700.562	13.865
992	Electrical Line	CH:266+400 to CH:266+500_right	630673.716	1168746.149	12.845
993	Electrical Line	CH:266+500 to CH:266+600_right	630618.489	1168782.563	15.766
994	Electrical Line	CH:266+600 to CH:266+700_left	630529.460	1168853.629	16.243
995	Electrical Line	CH:266+600 to CH:266+700_right	630542.139	1168864.939	13.917
996	Electrical Line	CH:266+600 to CH:266+700_right	630501.139	1168910.933	15.817
997	Electrical Line	CH:266+700 to CH:266+800_left	630455.691	1168920.174	16.810
998	Electrical Line	CH:266+700 to CH:266+800_left	630474.088	1168917.630	15.788
999	Electrical Line	CH:266+800 to CH:266+900_right	630358.121	1169025.506	14.605
1000	Electrical Line	CH:267+000 to CH:267+100_left	630179.952	1169133.860	11.487
1001	Electrical Line	CH:267+300 to CH:267+400_right	630003.811	1169295.706	8.440
1002	Electrical Line	CH:267+700 to CH:267+800_left	629645.140	1169512.707	11.333
1003	Electrical Line	CH:267+700 to CH:267+800_left	629658.413	1169495.223	10.688
1004	Electrical Line	CH:267+700 to CH:267+800_right	629607.685	1169555.383	12.288
1005	Electrical Line	CH:268+300 to CH:268+400_right	629150.885	1169868.322	9.567
1006	Electrical Line	CH:269+100 to CH:269+200_right	628499.443	1170318.787	11.095
1007	Electrical Line	CH:269+200 to CH:269+300_right	628374.197	1170403.564	15.254
1008	Electrical Line	CH:269+300 to CH:269+400_left	628309.055	1170437.558	13.162
1009	Electrical Line	CH:269+300 to CH:269+400_left	628300.992	1170450.696	14.694
1010	Electrical Line	CH:269+500 to CH:269+600_left	628177.815	1170546.078	17.675
1011	Electrical Line	CH:269+500 to CH:269+600_right	628155.292	1170569.549	19.297
1012	Electrical Line	CH:269+600 to CH:269+700_left	628095.078	1170618.711	22.477
1013	Electrical Line	CH:270+000 to CH:270+100_left	627800.307	1170920.869	18.351
1014	Electrical Line	CH:270+000 to CH:270+100_left	627783.926	1170941.408	18.548
1015	Electrical Line	CH:270+100 to CH:270+200_left	627751.016	1170984.430	20.230
1016	Electrical Line	CH:270+100 to CH:270+200_right	627779.226	1170952.926	19.696
1017	Electrical Line	CH:270+100 to CH:270+200_right	627772.055	1170962.886	20.212
1018	Electrical Line	CH:270+200 to CH:270+300_left	627702.828	1171030.753	21.709
1019	Electrical Line	CH:270+200 to CH:270+300_right	627660.176	1171099.503	21.421
1020	Electrical Line	CH:270+300 to CH:270+400_right	627652.614	1171115.859	23.011
1021	Electrical Line	CH:270+400 to CH:270+500_left	627540.226	1171228.471	17.692
1022	Electrical Line	CH:270+400 to CH:270+500_right	627532.271	1171246.091	18.727
1023	Electrical Line	CH:270+500 to CH:270+600_right	627497.822	1171286.383	16.167
1024	Electrical Line	CH:270+800 to CH:270+900_left	627316.555	1171493.892	12.890
1025	Electrical Line	CH:271+200 to CH:271+300_right	627063.347	1171830.646	12.491
1026	Electrical Line	CH:271+300 to CH:271+400_right	627000.450	1171892.336	21.315
1027	Electrical Line	CH:271+400 to CH:271+500_left	626903.757	1171972.336	21.699
1028	Electrical Line	CH:271+400 to CH:271+500_right	626888.009	1172006.189	21.462
1029	Electrical Line	CH:271+900 to CH:272+000_left	626569.032	1172372.956	19.799
1030	Electrical Line	CH:271+900 to CH:272+000_right	626555.506	1172393.318	19.238
1031	Electrical Line	CH:272+000 to CH:272+100_left	626489.183	1172458.592	24.076
1032	Electrical Line	CH:272+000 to CH:272+100_right	626503.808	1172450.766	25.232
1033	Electrical Line	CH:272+200 to CH:272+300_left	626352.444	1172595.562	20.190
1034	Electrical Line	CH:272+200 to CH:272+300_left	626338.982	1172598.662	20.393
1035	Electrical Line	CH:272+600 to CH:272+700_right	626045.740	1172864.258	16.311
1036	Electrical Line	CH:273+100 to CH:273+200_left	625611.349	1173107.998	28.738
1037	Electrical Line	CH:273+100 to CH:273+200_right	625625.745	1173125.217	25.496
1038	Electrical Line	CH:273+200 to CH:273+300_right	625562.823	1173159.110	28.110

1039	Electrical Line	CH:273+300 to CH:273+400_left	625497.856	1173181.796	24.160
1040	Electrical Line	CH:273+300 to CH:273+400_right	625436.422	1173218.934	18.903
1041	Electrical Line	CH:273+500 to CH:273+600_left	625262.888	1173296.007	16.134
1042	Electrical Line	CH:273+700 to CH:273+800_right	625142.824	1173358.689	15.905
1043	Electrical Line	CH:273+900 to CH:274+000_left	624963.493	1173430.775	16.769
1044	Electrical Line	CH:274+000 to CH:274+100_right	624805.849	1173523.697	20.144
1045	Electrical Line	CH:274+400 to CH:274+500_left	624527.770	1173652.963	16.424
1046	Electrical Line	CH:274+400 to CH:274+500_right	624519.525	1173672.003	14.958
1047	Electrical Line	CH:274+700 to CH:274+800_left	624191.903	1173812.047	27.625
1048	Electrical Line	CH:274+800 to CH:274+900_left	624168.004	1173824.689	28.269
1049	Electrical Line	CH:274+800 to CH:274+900_right	624126.570	1173856.597	29.654
1050	Electrical Line	CH:274+800 to CH:274+900_right	624106.131	1173875.417	27.117
1051	Electrical Line	CH:274+900 to CH:275+000_left	623996.506	1173906.105	25.924
1052	Electrical Line	CH:274+900 to CH:275+000_left	624022.962	1173900.521	26.634
1053	Electrical Line	CH:275+200 to CH:275+300_left	623795.947	1174002.314	20.861
1054	Electrical Line	CH:275+200 to CH:275+300_left	623740.992	1174028.245	19.287
1055	Electrical Line	CH:275+200 to CH:275+300_left	623739.614	1174043.010	19.419
1056	Electrical Line	CH:275+300 to CH:275+400_right	623643.222	1174112.653	18.605
1057	Electrical Line	CH:275+400 to CH:275+500_right	623619.306	1174119.751	19.158
1058	Electrical Line	CH:275+500 to CH:275+600_left	623486.347	1174206.036	21.887
1059	Electrical Line	CH:275+700 to CH:275+800_left	623358.166	1174301.678	27.903
1060	Electrical Line	CH:275+700 to CH:275+800_right	623345.636	1174313.599	26.419
1061	Electrical Line	CH:275+800 to CH:275+900_left	623307.880	1174339.236	26.380
1062	Electrical Line	CH:275+800 to CH:275+900_left	623279.573	1174364.775	27.935
1063	Electrical Line	CH:275+900 to CH:276+000_right	623184.087	1174446.518	30.264
1064	Electrical Line	CH:276+000 to CH:276+100_right	623121.630	1174489.856	34.477
1065	Electrical Line	CH:276+000 to CH:276+100_right	623114.814	1174504.307	29.742
1066	Electrical Line	CH:276+500 to CH:276+600_left	622685.097	1174826.447	17.031
1067	Electrical Line	CH:276+500 to CH:276+600_left	622726.895	1174796.758	15.374
1068	Electrical Line	CH:276+500 to CH:276+600_left	622698.127	1174817.496	14.675
1069	Electrical Line	CH:276+600 to CH:276+700_right	622641.525	1174873.254	14.004
1070	Electrical Line	CH:276+900 to CH:277+000_left	622449.789	1175020.236	15.974
1071	Electrical Line	CH:276+900 to CH:277+000_right	622455.361	1175028.878	16.309
1072	Electrical Line	CH:277+000 to CH:277+100_left	622292.125	1175097.745	15.832
1073	Electrical Line	CH:277+000 to CH:277+100_right	622360.901	1175090.600	14.824
1074	Electrical Line	CH:277+100 to CH:277+200_right	622271.218	1175167.965	16.228
1075	Electrical Line	CH:277+100 to CH:277+200_right	622250.646	1175183.564	14.317
1076	Electrical Line	CH:277+800 to CH:277+900_left	621701.957	1175586.723	12.703
1077	High Transmission Line	CH:278+600 to CH:278+700_left	621023.723	1176074.111	14.774
1078	High Transmission Line	CH:278+700 to CH:278+800_left	620946.320	1176044.008	16.548
1079	Electrical Line	CH:278+700 to CH:278+800_left	620928.079	1176127.608	12.686
1080	Electrical Line	CH:278+700 to CH:278+800_right	620937.304	1176168.545	13.125
1081	Electrical Line	CH:278+900 to CH:279+000_left	620823.507	1176204.308	11.960
1082	Electrical Line	CH:278+900 to CH:279+000_left	620812.439	1176221.593	12.350
1083	Electrical Line	CH:279+000 to CH:279+100_left	620688.456	1176319.575	11.392
1084	Electrical Line	CH:279+000 to CH:279+100_left	620700.717	1176309.054	12.848
1085	Electrical Line	CH:279+400 to CH:279+500_right	620399.218	1176599.034	11.466
1086	Electrical Line	CH:280+400 to CH:280+500_right	619746.960	1177362.920	11.641
1087	Electrical Line	CH:281+200 to CH:281+300_left	619235.616	1177905.092	13.701
1088	Electrical Line	CH:281+300 to CH:281+400_left	619201.579	1177956.478	10.161
1089	High Transmission Line	CH:281+400 to CH:281+500_left	619082.335	1178083.391	18.599
1090	Electrical Line	CH:281+400 to CH:281+500_right	619111.764	1178066.186	13.397

1091	Electrical Line	CH:281+500 to CH:281+600_left	619020.306	1178166.945	14.898
1092	Electrical Line	CH:281+700 to CH:281+800_left	618866.568	1178315.663	17.992
1093	Electrical Line	CH:281+700 to CH:281+800_left	618878.832	1178317.547	14.305
1094	High Transmission Line	CH:281+800 to CH:281+900_left	618850.483	1178315.896	21.710
1095	Electrical Line	CH:281+900 to CH:282+000_left	618745.876	1178479.859	20.240
1096	Electrical Line	CH:281+900 to CH:282+000_right	618747.901	1178482.023	26.866
1097	Electrical Line	CH:282+000 to CH:282+100_right	618740.305	1178491.419	21.512
1098	Electrical Line	CH:282+100 to CH:282+200_right	618637.406	1178608.735	20.011
1099	Electrical Line	CH:282+100 to CH:282+200_right	618633.255	1178615.319	20.012
1100	Electrical Line	CH:282+200 to CH:282+300_right	618590.356	1178664.750	14.546
1101	Electrical Line	CH:282+500 to CH:282+600_right	618381.203	1178914.963	10.969
1102	Electrical Line	CH:282+900 to CH:283+000_left	618132.619	1179177.402	10.832
1103	Electrical Line	CH:282+900 to CH:283+000_right	618106.058	1179228.873	11.078
1104	Electrical Line	CH:282+900 to CH:283+000_right	618161.693	1179189.942	8.615
1105	Electrical Line	CH:283+000 to CH:283+100_left	618069.024	1179252.170	10.124
1106	Electrical Line	CH:283+200 to CH:283+300_left	617883.258	1179450.133	10.025
1107	Electrical Line	CH:283+300 to CH:283+400_left	617862.783	1179480.628	11.503
1108	Electrical Line	CH:283+300 to CH:283+400_right	617882.480	1179497.913	10.673
1109	Electrical Line	CH:283+400 to CH:283+500_right	617808.331	1179578.023	13.368
1110	Electrical Line	CH:283+400 to CH:283+500_right	617794.646	1179584.100	9.239
1111	Electrical Line	CH:283+500 to CH:283+600_right	617741.819	1179649.793	8.918
1112	Electrical Line	CH:283+900 to CH:284+000_right	617493.272	1179925.383	21.610
1113	Electrical Line	CH:283+900 to CH:284+000_right	617464.438	1179961.648	26.121
1114	Electrical Line	CH:284+200 to CH:284+300_left	617277.586	1180160.157	19.447
1115	Electrical Line	CH:284+200 to CH:284+300_left	617270.097	1180176.617	16.763
1116	Electrical Line	CH:284+400 to CH:284+500_right	617140.021	1180332.707	12.565
1117	Electrical Line	CH:284+500 to CH:284+600_right	617101.070	1180392.659	15.751
1118	Electrical Line	CH:284+600 to CH:284+700_right	617008.270	1180510.943	20.314
1119	Electrical Line	CH:284+700 to CH:284+800_right	616960.915	1180584.297	21.193
1120	Electrical Line	CH:284+800 to CH:284+900_left	616907.428	1180635.560	28.302
1121	Electrical Line	CH:284+800 to CH:284+900_right	616904.263	1180649.134	28.856
1122	Electrical Line	CH:284+900 to CH:285+000_left	616859.770	1180689.823	37.705
1123	Electrical Line	CH:285+000 to CH:285+100_left	616786.756	1180815.849	31.333
1124	Electrical Line	CH:285+200 to CH:285+300_right	616714.509	1180992.858	10.949
1125	Electrical Line	CH:285+400 to CH:285+500_right	616627.341	1181165.349	8.212
1126	Electrical Line	CH:285+400 to CH:285+500_right	616636.441	1181140.072	9.959
1127	Electrical Line	CH:285+500 to CH:285+600_right	616573.282	1181277.048	11.407
1128	Electrical Line	CH:285+600 to CH:285+700_right	616533.595	1181348.231	10.176
1129	Electrical Line	CH:286+000 to CH:286+100_left	616336.889	1181740.876	16.622
1130	Electrical Line	CH:286+000 to CH:286+100_right	616369.681	1181677.462	14.660
1131	Electrical Line	CH:286+100 to CH:286+200_left	616305.994	1181795.558	18.119
1132	Electrical Line	CH:286+100 to CH:286+200_left	616286.917	1181821.584	18.824
1133	Electrical Line	CH:286+200 to CH:286+300_left	616251.827	1181914.188	20.298
1134	Electrical Line	CH:286+400 to CH:286+500_left	616157.135	1182097.575	12.497
1135	Electrical Line	CH:286+400 to CH:286+500_right	616181.644	1182062.638	12.698
1136	Electrical Line	CH:286+600 to CH:286+700_right	616073.256	1182288.664	20.539
1137	Electrical Line	CH:286+700 to CH:286+800_left	616033.309	1182346.657	26.558
1138	Electrical Line	CH:286+700 to CH:286+800_left	616031.744	1182357.881	26.505
1139	Electrical Line	CH:286+900 to CH:287+000_left	615942.482	1182530.608	30.749
1140	Electrical Line	CH:286+900 to CH:287+000_right	615963.583	1182502.231	37.048
1141	Electrical Line	CH:287+000 to CH:287+100_left	615918.590	1182581.186	26.982
1142	Electrical Line	CH:287+000 to CH:287+100_right	615913.740	1182607.008	26.076

1143	Electrical Line	CH:287+300 to CH:287+400_left	615766.907	1182894.102	12.263
1144	Electrical Line	CH:287+300 to CH:287+400_right	615786.815	1182861.276	13.367
1145	Electrical Line	CH:287+500 to CH:287+600_right	615707.096	1183033.687	9.615
1146	Electrical Line	CH:287+600 to CH:287+700_left	615629.290	1183167.625	15.772
1147	Electrical Line	CH:287+800 to CH:287+900_right	615559.498	1183349.686	14.551
1148	Electrical Line	CH:287+900 to CH:288+000_right	615531.418	1183384.965	14.927
1149	Electrical Line	CH:288+000 to CH:288+100_left	615448.048	1183508.131	25.803
1150	Electrical Line	CH:288+100 to CH:288+200_left	615415.084	1183608.518	39.212
1151	Electrical Line	CH:288+100 to CH:288+200_left	615406.157	1183624.157	39.529
1152	Electrical Line	CH:288+200 to CH:288+300_right	615366.062	1183718.543	25.760
1153	Electrical Line	CH:288+700 to CH:288+800_left	615162.640	1184112.109	7.815
1154	Electrical Line	CH:288+900 to CH:289+000_right	615057.671	1184366.878	23.562
1155	Electrical Line	CH:289+000 to CH:289+100_left	615024.163	1184391.761	27.646
1156	Electrical Line	CH:289+000 to CH:289+100_right	615040.719	1184404.368	28.343
1157	Electrical Line	CH:289+100 to CH:289+200_right	614970.968	1184520.674	17.015
1158	Electrical Line	CH:289+300 to CH:289+400_left	614868.852	1184711.112	8.442
1159	Electrical Line	CH:289+400 to CH:289+500_right	614849.724	1184795.857	7.158
1160	Electrical Line	CH:289+400 to CH:289+500_right	614855.206	1184765.967	7.913
1161	Electrical Line	CH:290+100 to CH:290+200_left	614533.320	1185402.754	17.283
1162	Electrical Line	CH:290+100 to CH:290+200_right	614558.521	1185361.356	15.651
1163	Electrical Line	CH:290+200 to CH:290+300_left	614493.698	1185477.165	14.426
1164	Electrical Line	CH:290+600 to CH:290+700_left	614283.335	1185884.917	21.189
1165	Electrical Line	CH:290+600 to CH:290+700_left	614332.921	1185804.459	14.968
1166	Electrical Line	CH:290+600 to CH:290+700_left	614299.042	1185859.779	20.077
1167	Electrical Line	CH:290+700 to CH:290+800_left	614276.633	1185919.559	18.332
1168	Electrical Line	CH:291+200 to CH:291+300_right	614023.981	1186400.794	4.115
1169	Electrical Line	CH:291+500 to CH:291+600_right	613871.701	1186598.199	9.661
1170	Electrical Line	CH:291+600 to CH:291+700_right	613792.582	1186700.260	9.361
1171	Electrical Line	CH:291+700 to CH:291+800_left	613725.182	1186743.708	5.330
1172	Electrical Line	CH:291+900 to CH:292+000_right	613577.426	1186961.177	9.570
1173	Electrical Line	CH:292+000 to CH:292+100_right	613538.293	1187011.385	9.233
1174	Electrical Line	CH:292+100 to CH:292+200_left	613441.242	1187112.015	9.663
1175	Electrical Line	CH:292+300 to CH:292+400_right	613353.941	1187267.261	10.638
1176	Electrical Line	CH:292+400 to CH:292+500_right	613263.930	1187356.261	16.166
1177	Electrical Line	CH:292+600 to CH:292+700_right	613179.389	1187469.111	9.861
1178	Electrical Line	CH:292+700 to CH:292+800_right	613129.104	1187525.133	10.152
1179	Electrical Line	CH:292+900 to CH:293+000_left	612960.173	1187723.798	24.106
1180	Electrical Line	CH:293+000 to CH:293+100_left	612924.875	1187761.250	23.799
1181	Electrical Line	CH:293+300 to CH:293+400_left	612710.834	1188007.974	26.960
1182	Electrical Line	CH:293+600 to CH:293+700_left	612526.389	1188249.355	10.073
1183	Electrical Line	CH:294+000 to CH:294+100_left	612306.602	1188587.803	24.319
1184	Electrical Line	CH:294+100 to CH:294+200_right	612253.400	1188695.627	6.497
1185	Electrical Line	CH:294+200 to CH:294+300_left	612220.645	1188748.002	6.504
1186	Electrical Line	CH:294+700 to CH:294+800_right	612042.448	1189239.677	19.081
1187	Electrical Line	CH:294+900 to CH:295+000_left	611974.147	1189409.199	23.902
1188	Electrical Line	CH:295+100 to CH:295+200_left	611915.323	1189610.906	9.046
1189	Electrical Line	CH:295+100 to CH:295+200_right	611930.303	1189602.941	9.152
1190	Electrical Line	CH:295+300 to CH:295+400_right	611891.127	1189774.740	7.949
1191	Electrical Line	CH:295+800 to CH:295+900_right	611746.926	1190300.153	9.135
1192	Electrical Line	CH:295+800 to CH:295+900_right	611736.288	1190314.033	8.505
1193	Electrical Line	CH:296+000 to CH:296+100_right	611682.073	1190502.932	8.786
1194	Electrical Line	CH:296+100 to CH:296+200_right	611670.910	1190528.480	9.773

1195	Electrical Line	CH:296+200 to CH:296+300_left	611623.198	1190625.604	9.369
1196	Electrical Line	CH:296+200 to CH:296+300_right	611658.108	1190632.720	10.598
1197	Electrical Line	CH:296+300 to CH:296+400_left	611580.773	1190797.927	10.403
1198	Electrical Line	CH:296+600 to CH:296+700_left	611517.760	1191032.913	9.030
1199	Electrical Line	CH:296+800 to CH:296+900_right	611473.038	1191274.719	9.331
1200	Electrical Line	CH:296+900 to CH:297+000_right	611432.314	1191384.905	12.107
1201	Electrical Line	CH:297+000 to CH:297+100_left	611400.262	1191479.847	10.508
1202	Electrical Line	CH:297+200 to CH:297+300_right	611374.826	1191592.561	10.730
1203	Electrical Line	CH:297+300 to CH:297+400_left	611340.561	1191698.847	9.214
1204	Electrical Line	CH:297+800 to CH:297+900_right	611203.225	1192222.743	10.700
1205	Electrical Line	CH:297+800 to CH:297+900_right	611226.813	1192197.382	12.333
1206	Electrical Line	CH:297+900 to CH:298+000_left	611179.847	1192261.497	11.439
1207	Electrical Line	CH:298+000 to CH:298+100_left	611147.508	1192381.704	17.877
1208	Electrical Line	CH:298+000 to CH:298+100_right	611152.999	1192382.274	15.127
1209	Electrical Line	CH:298+200 to CH:298+300_left	611077.179	1192620.548	16.612
1210	Electrical Line	CH:298+300 to CH:298+400_right	611075.584	1192681.611	12.826
1211	Electrical Line	CH:298+600 to CH:298+700_left	610969.765	1193014.652	9.193
1212	Electrical Line	CH:299+300 to CH:299+400_right	610745.074	1193674.351	8.234
1213	High Transmission Line	CH:299+500 to CH:299+600_right	610667.213	1193850.880	11.554
1214	Electrical Line	CH:299+600 to CH:299+700_left	610606.682	1193952.129	9.342
1215	Electrical Line	CH:299+700 to CH:299+800_left	610588.231	1194023.153	9.524
1216	Electrical Line	CH:299+800 to CH:299+900_left	610572.569	1194057.740	10.084
1217	Electrical Line	CH:300+000 to CH:300+100_right	610508.045	1194254.992	10.075
1218	Electrical Line	CH:300+100 to CH:300+200_left	610433.879	1194392.243	13.103
1219	Electrical Line	CH:300+200 to CH:300+300_right	610427.089	1194478.245	13.168
1220	Electrical Line	CH:300+700 to CH:300+800_right	610207.189	1194975.205	17.832
1221	Electrical Line	CH:300+700 to CH:300+800_right	610218.448	1194962.047	14.663
1222	Electrical Line	CH:300+800 to CH:300+900_right	610176.549	1195061.770	23.064
1223	Electrical Line	CH:302+400 to CH:302+500_right	609595.764	1196532.523	22.415
1224	Electrical Line	CH:302+500 to CH:302+600_left	609547.097	1196601.563	26.503
1225	Electrical Line	CH:302+500 to CH:302+600_left	609551.474	1196602.059	25.633
1226	Electrical Line	CH:302+800 to CH:302+900_right	609454.742	1196860.777	21.998
1227	Electrical Line	CH:303+600 to CH:303+700_left	609145.498	1197603.103	30.463
1228	Electrical Line	CH:304+200 to CH:304+300_left	608896.066	1198217.020	22.980
1229	Electrical Line	CH:304+400 to CH:304+500_right	608838.453	1198381.851	13.050
1230	Electrical Line	CH:304+600 to CH:304+700_left	608735.950	1198591.907	13.089
1231	Electrical Line	CH:304+600 to CH:304+700_right	608773.232	1198593.532	12.518
1232	Electrical Line	CH:304+700 to CH:304+800_left	608729.932	1198594.186	15.510
1233	Electrical Line	CH:304+700 to CH:304+800_left	608710.426	1198648.396	14.707
1234	Electrical Line	CH:305+200 to CH:305+300_right	608559.922	1199084.275	12.360
1235	Electrical Line	CH:305+400 to CH:305+500_left	608441.852	1199334.187	12.719
1236	Electrical Line	CH:305+500 to CH:305+600_right	608426.444	1199397.173	12.667
1237	Electrical Line	CH:305+600 to CH:305+700_right	608395.544	1199455.281	11.813
1238	Electrical Line	CH:305+900 to CH:306+000_left	608233.472	1199776.537	17.862
1239	Electrical Line	CH:305+900 to CH:306+000_right	608244.492	1199783.775	17.889
1240	Electrical Line	CH:306+300 to CH:306+400_left	608086.043	1200068.399	14.716
1241	Electrical Line	CH:306+300 to CH:306+400_right	608059.299	1200125.176	12.948
1242	Electrical Line	CH:306+500 to CH:306+600_left	607982.219	1200247.405	14.986
1243	Electrical Line	CH:306+500 to CH:306+600_right	607967.276	1200316.750	13.143
1244	Electrical Line	CH:306+600 to CH:306+700_right	607925.666	1200409.700	11.821
1245	Electrical Line	CH:307+600 to CH:307+700_right	607465.580	1201304.457	12.407
1246	Electrical Line	CH:307+600 to CH:307+700_right	607489.856	1201255.801	13.997

1247	Electrical Line	CH:307+900 to CH:308+000_left	607353.116	1201510.004	12.163
1248	Electrical Line	CH:308+400 to CH:308+500_left	607090.079	1201971.003	11.519
1249	Electrical Line	CH:308+400 to CH:308+500_right	607128.788	1201946.734	10.011
1250	Electrical Line	CH:308+600 to CH:308+700_left	607007.478	1202096.807	13.401
1251	Electrical Line	CH:309+400 to CH:309+500_right	606398.563	1202654.185	15.569
1252	Electrical Line	CH:309+500 to CH:309+600_left	606331.611	1202664.838	17.995
1253	Electrical Line	CH:311+200 to CH:311+300_left	604711.175	1203294.934	14.834
1254	High Transmission Line	CH:311+700 to CH:311+800_right	604319.295	1203606.884	24.041
1255	Electrical Line	CH:315+300 to CH:315+400_left	601496.230	1205885.638	12.696
1256	Electrical Line	CH:316+300 to CH:316+400_right	600978.396	1206663.279	13.916
1257	Electrical Line	CH:317+700 to CH:317+800_right	600203.705	1207828.359	14.936
1258	High Transmission Line	CH:317+900 to CH:318+000_right	600067.147	1208067.528	23.737
1259	Electrical Line	CH:319+700 to CH:319+800_left	599046.370	1209516.356	14.886
1260	Electrical Line	CH:319+700 to CH:319+800_right	599064.118	1209498.555	15.347
1261	Electrical Line	CH:319+700 to CH:319+800_right	599032.650	1209541.400	14.488
1262	Electrical Line	CH:319+800 to CH:319+900_left	598977.802	1209615.176	14.902
1263	Electrical Line	CH:319+900 to CH:320+000_left	598962.203	1209637.322	13.138
1264	Electrical Line	CH:319+900 to CH:320+000_left	598940.040	1209661.078	12.587
1265	Electrical Line	CH:321+300 to CH:321+400_left	598182.710	1210809.708	14.648
1266	Electrical Line	CH:321+300 to CH:321+400_right	598165.079	1210846.056	14.365
1267	Electrical Line	CH:321+900 to CH:322+000_left	597844.984	1211308.362	11.751
1268	Electrical Line	CH:322+800 to CH:322+900_left	597326.824	1212117.159	11.497
1269	Electrical Line	CH:322+800 to CH:322+900_left	597365.444	1212064.835	11.311
1270	Electrical Line	CH:322+800 to CH:322+900_right	597374.609	1212059.289	11.501
1271	Electrical Line	CH:322+900 to CH:323+000_left	597290.831	1212191.296	12.398
1272	Electrical Line	CH:328+700 to CH:328+800_left	595280.726	1217540.761	16.283
1273	Electrical Line	CH:343+100 to CH:343+200_right	590401.582	1230886.097	7.348
1274	Electrical Line	CH:343+300 to CH:343+400_left	590330.327	1231044.865	6.522
1275	Electrical Line	CH:343+400 to CH:343+500_left	590314.564	1231086.371	6.313
1276	Electrical Line	CH:344+000 to CH:344+100_left	590217.596	1231683.441	5.786
1277	Electrical Line	CH:344+000 to CH:344+100_right	590231.108	1231675.623	5.190
1278	Electrical Line	CH:344+300 to CH:344+400_right	590274.081	1232055.646	6.830
1279	Electrical Line	CH:344+300 to CH:344+400_right	590257.397	1232041.318	7.196
1280	Electrical Line	CH:344+600 to CH:344+700_right	590305.949	1232285.741	5.936
1281	Electrical Line	CH:344+700 to CH:344+800_right	590327.960	1232380.286	5.498
1282	Electrical Line	CH:344+800 to CH:344+900_right	590348.604	1232484.049	6.773
1283	Electrical Line	CH:345+000 to CH:345+100_left	590388.832	1232744.949	7.780
1284	Electrical Line	CH:345+000 to CH:345+100_right	590406.380	1232744.943	7.496
1285	Electrical Line	CH:347+300 to CH:347+400_left	590667.995	1235028.424	6.334
1286	Electrical Line	CH:347+400 to CH:347+500_left	590668.698	1235042.248	7.517
1287	Electrical Line	CH:347+500 to CH:347+600_right	590663.997	1235188.650	8.146
1288	Electrical Line	CH:348+700 to CH:348+800_right	590376.523	1236331.501	6.572
1289	Electrical Line	CH:348+900 to CH:349+000_right	590296.040	1236522.043	7.900
1290	Electrical Line	CH:349+000 to CH:349+100_left	590231.472	1236611.309	5.515
1291	Electrical Line	CH:349+200 to CH:349+300_left	590107.391	1236795.808	14.337
1292	Electrical Line	CH:349+300 to CH:349+400_right	590071.067	1236845.512	20.368
1293	Electrical Line	CH:352+900 to CH:353+000_left	587372.177	1239188.158	10.025
1294	Electrical Line	CH:352+900 to CH:353+000_left	587356.331	1239191.791	10.011
1295	Electrical Line	CH:353+000 to CH:353+100_left	587258.575	1239269.480	11.567
1296	Electrical Line	CH:353+300 to CH:353+400_left	587062.455	1239436.073	15.577
1297	Electrical Line	CH:353+300 to CH:353+400_right	587032.560	1239475.439	15.359
1298	Electrical Line	CH:353+500 to CH:353+600_left	586927.708	1239577.455	13.685

1299	Electrical Line	CH:353+600 to CH:353+700_left	586856.137	1239675.068	12.962
1300	Electrical Line	CH:353+700 to CH:353+800_left	586783.233	1239789.437	12.044
1301	Electrical Line	CH:353+800 to CH:353+900_left	586742.512	1239861.994	12.887
1302	Electrical Line	CH:354+000 to CH:354+100_left	586639.930	1240069.478	10.937
1303	Electrical Line	CH:354+500 to CH:354+600_right	586513.795	1240525.733	13.868
1304	Electrical Line	CH:354+600 to CH:354+700_left	586489.307	1240606.342	11.425
1305	Electrical Line	CH:354+700 to CH:354+800_left	586467.454	1240689.183	11.630
1306	Electrical Line	CH:354+700 to CH:354+800_left	586438.039	1240759.102	13.260
1307	Electrical Line	CH:354+800 to CH:354+900_left	586417.171	1240856.147	13.865
1308	Electrical Line	CH:355+000 to CH:355+100_left	586386.435	1240964.417	13.137
1309	Electrical Line	CH:355+300 to CH:355+400_left	586267.818	1241299.805	10.822
1310	Electrical Line	CH:355+400 to CH:355+500_left	586234.388	1241413.319	13.483
1311	Electrical Line	CH:355+500 to CH:355+600_left	586224.789	1241446.496	14.249
1312	Electrical Line	CH:355+500 to CH:355+600_left	586194.312	1241484.306	14.414
1313	Electrical Line	CH:355+800 to CH:355+900_left	586073.333	1241798.464	8.674
1314	Electrical Line	CH:355+800 to CH:355+900_right	586115.314	1241719.042	10.833
1315	Electrical Line	CH:355+900 to CH:356+000_right	586054.136	1241863.856	8.480
1316	Electrical Line	CH:355+900 to CH:356+000_right	586033.297	1241867.548	8.666
1317	Electrical Line	CH:356+000 to CH:356+100_left	585965.802	1241968.436	5.285
1318	Electrical Line	CH:356+100 to CH:356+200_right	585947.282	1242007.518	5.766
1319	Electrical Line	CH:356+300 to CH:356+400_right	585823.321	1242153.961	5.800
1320	Electrical Line	CH:356+500 to CH:356+600_left	585629.324	1242339.156	5.734
1321	Electrical Line	CH:356+600 to CH:356+700_left	585617.824	1242348.957	7.003
1322	Electrical Line	CH:356+700 to CH:356+800_right	585542.365	1242433.960	6.716
1323	Electrical Line	CH:356+700 to CH:356+800_right	585531.705	1242445.433	6.099
1324	Electrical Line	CH:356+900 to CH:357+000_left	585391.490	1242575.378	6.639
1325	Electrical Line	CH:356+900 to CH:357+000_right	585378.070	1242600.609	7.420
1326	Electrical Line	CH:357+000 to CH:357+100_left	585345.548	1242624.062	5.094
1327	Electrical Line	CH:357+000 to CH:357+100_right	585292.295	1242706.074	6.772
1328	Electrical Line	CH:357+100 to CH:357+200_left	585253.373	1242766.291	8.713
1329	Electrical Line	CH:357+100 to CH:357+200_left	585276.154	1242728.835	5.777
1330	Electrical Line	CH:357+100 to CH:357+200_right	585259.074	1242784.726	6.846
1331	Electrical Line	CH:357+200 to CH:357+300_left	585223.538	1242846.415	7.859
1332	Electrical Line	CH:357+300 to CH:357+400_left	585192.935	1242978.116	8.593
1333	Electrical Line	CH:358+000 to CH:358+100_left	585066.040	1243620.315	14.025
1334	Electrical Line	CH:358+100 to CH:358+200_right	585055.874	1243716.207	12.394
1335	Electrical Line	CH:358+200 to CH:358+300_right	585029.016	1243830.247	15.126
1336	Electrical Line	CH:358+300 to CH:358+400_left	585006.558	1243883.825	13.186
1337	Electrical Line	CH:358+300 to CH:358+400_right	585022.570	1243878.508	13.379
1338	Electrical Line	CH:358+400 to CH:358+500_left	584987.230	1244022.035	13.313
1339	Electrical Line	CH:358+400 to CH:358+500_right	584999.823	1243985.578	11.667
1340	Electrical Line	CH:358+700 to CH:358+800_right	584923.403	1244280.137	11.916
1341	Electrical Line	CH:359+200 to CH:359+300_right	584703.443	1244813.563	14.390
1342	Electrical Line	CH:359+300 to CH:359+400_left	584678.555	1244863.300	13.976
1343	Electrical Line	CH:359+500 to CH:359+600_left	584604.703	1245022.349	10.205
1344	Electrical Line	CH:359+600 to CH:359+700_left	584550.074	1245168.676	11.471
1345	Electrical Line	CH:360+000 to CH:360+100_left	584433.084	1245462.203	12.016
1346	Electrical Line	CH:360+100 to CH:360+200_left	584382.838	1245580.500	12.805
1347	Electrical Line	CH:360+100 to CH:360+200_left	584379.209	1245546.489	11.729
1348	Electrical Line	CH:360+500 to CH:360+600_right	584231.931	1245929.380	11.583
1349	Electrical Line	CH:360+600 to CH:360+700_left	584176.909	1246025.058	10.826
1350	Electrical Line	CH:360+800 to CH:360+900_right	584101.581	1246201.139	10.387

1351	Electrical Line	CH:360+900 to CH:361+000_right	584058.484	1246305.008	7.054
1352	Electrical Line	CH:361+100 to CH:361+200_right	583958.678	1246530.698	9.531
1353	Electrical Line	CH:361+200 to CH:361+300_left	583909.510	1246627.488	10.245
1354	Electrical Line	CH:361+300 to CH:361+400_right	583901.652	1246681.861	9.709
1355	Electrical Line	CH:361+400 to CH:361+500_right	583866.702	1246765.311	9.208
1356	Electrical Line	CH:361+500 to CH:361+600_left	583781.283	1246898.082	9.873
1357	Electrical Line	CH:361+600 to CH:361+700_right	583752.030	1247014.315	10.282
1358	Electrical Line	CH:361+600 to CH:361+700_right	583778.087	1246982.499	11.160
1359	Electrical Line	CH:361+700 to CH:361+800_right	583741.845	1247049.577	10.330
1360	Electrical Line	CH:361+800 to CH:361+900_left	583673.199	1247162.338	10.966
1361	Electrical Line	CH:361+900 to CH:362+000_right	583644.151	1247281.921	9.551
1362	Electrical Line	CH:362+000 to CH:362+100_right	583630.654	1247326.616	8.891
1363	Electrical Line	CH:362+100 to CH:362+200_right	583590.878	1247403.605	10.218
1364	Electrical Line	CH:362+400 to CH:362+500_right	583449.104	1247740.814	12.528
1365	Electrical Line	CH:362+800 to CH:362+900_left	583294.319	1248088.664	10.178
1366	Electrical Line	CH:363+100 to CH:363+200_left	583183.359	1248354.391	11.170
1367	Electrical Line	CH:363+300 to CH:363+400_left	583091.123	1248582.336	9.862
1368	Electrical Line	CH:363+400 to CH:363+500_left	583088.663	1248615.393	11.368
1369	Electrical Line	CH:363+500 to CH:363+600_left	583050.139	1248701.634	9.563
1370	Electrical Line	CH:363+700 to CH:363+800_left	582968.978	1248945.842	8.920
1371	Electrical Line	CH:363+700 to CH:363+800_left	582972.795	1248893.141	8.861
1372	Electrical Line	CH:363+800 to CH:363+900_right	582931.098	1249041.857	10.051
1373	Electrical Line	CH:363+900 to CH:364+000_left	582908.090	1249055.377	10.305
1374	Electrical Line	CH:364+000 to CH:364+100_left	582863.834	1249199.311	10.992
1375	Electrical Line	CH:364+200 to CH:364+300_left	582780.342	1249397.783	12.058
1376	Electrical Line	CH:364+300 to CH:364+400_left	582722.440	1249508.764	10.856
1377	Electrical Line	CH:366+900 to CH:367+000_right	581747.726	1251822.894	11.676
1378	Electrical Line	CH:367+000 to CH:367+100_left	581675.235	1251944.994	11.689
1379	Electrical Line	CH:367+100 to CH:367+200_left	581639.308	1252011.457	11.001
1380	Electrical Line	CH:367+300 to CH:367+400_left	581536.118	1252179.165	10.971
1381	Electrical Line	CH:367+400 to CH:367+500_left	581480.762	1252273.414	12.870
1382	Electrical Line	CH:367+400 to CH:367+500_right	581486.174	1252299.576	13.660
1383	Electrical Line	CH:367+500 to CH:367+600_right	581457.770	1252350.199	13.922
1384	Electrical Line	CH:367+500 to CH:367+600_right	581441.176	1252381.154	15.869
1385	Electrical Line	CH:367+800 to CH:367+900_right	581321.017	1252612.056	11.945
1386	Electrical Line	CH:367+800 to CH:367+900_right	581298.528	1252630.576	11.092
1387	Electrical Line	CH:368+100 to CH:368+200_left	581156.800	1252867.140	9.602
1388	Electrical Line	CH:368+500 to CH:368+600_left	580966.189	1253222.477	11.196
1389	Electrical Line	CH:368+500 to CH:368+600_right	580956.308	1253284.340	10.430
1390	Electrical Line	CH:368+500 to CH:368+600_right	580945.492	1253300.715	9.874
1391	Electrical Line	CH:368+600 to CH:368+700_right	580939.508	1253315.764	10.297
1392	Electrical Line	CH:368+600 to CH:368+700_right	580926.546	1253350.826	11.779
1393	Electrical Line	CH:368+700 to CH:368+800_left	580898.379	1253406.816	8.175
1394	Electrical Line	CH:368+700 to CH:368+800_right	580879.833	1253494.101	9.310
1395	Electrical Line	CH:368+900 to CH:369+000_right	580844.451	1253621.011	8.561
1396	Electrical Line	CH:369+100 to CH:369+200_left	580801.157	1253800.159	8.215
1397	Electrical Line	CH:369+100 to CH:369+200_left	580799.372	1253827.450	8.761
1398	Electrical Line	CH:369+100 to CH:369+200_left	580796.171	1253851.665	8.445
1399	Electrical Line	CH:369+100 to CH:369+200_right	580806.534	1253839.135	9.910
1400	Electrical Line	CH:369+200 to CH:369+300_left	580779.274	1253900.929	7.399
1401	Electrical Line	CH:369+200 to CH:369+300_left	580787.205	1253932.101	7.553
1402	Electrical Line	CH:369+200 to CH:369+300_left	580783.079	1253969.347	8.159

1403	Electrical Line	CH:369+200 to CH:369+300_right	580782.302	1253988.179	8.370
1404	Electrical Line	CH:369+200 to CH:369+300_right	580793.976	1253948.122	9.996
1405	Electrical Line	CH:369+300 to CH:369+400_left	580769.095	1253992.404	8.186
1406	Electrical Line	CH:369+300 to CH:369+400_left	580768.334	1253988.606	10.732
1407	Electrical Line	CH:369+400 to CH:369+500_right	580775.232	1254104.947	8.780
1408	Electrical Line	CH:369+600 to CH:369+700_left	580759.294	1254329.103	7.929
1409	Electrical Line	CH:369+700 to CH:369+800_left	580751.932	1254433.194	6.636
1410	Electrical Line	CH:369+800 to CH:369+900_left	580739.449	1254562.843	3.942
1411	Electrical Line	CH:370+100 to CH:370+200_left	580728.077	1254839.644	6.080
1412	Electrical Line	CH:370+300 to CH:370+400_left	580716.744	1254986.564	5.438
1413	Electrical Line	CH:370+500 to CH:370+600_right	580710.430	1255214.848	5.601
1414	Electrical Line	CH:371+000 to CH:371+100_right	580688.694	1255768.401	5.527
1415	Electrical Line	CH:371+200 to CH:371+300_left	580667.741	1255947.784	8.401
1416	Electrical Line	CH:371+200 to CH:371+300_right	580667.276	1255974.802	8.438
1417	Electrical Line	CH:371+300 to CH:371+400_left	580649.914	1255995.784	7.858
1418	Electrical Line	CH:371+300 to CH:371+400_left	580654.489	1256081.396	9.118
1419	Electrical Line	CH:371+500 to CH:371+600_left	580646.158	1256267.645	10.455
1420	Electrical Line	CH:371+500 to CH:371+600_right	580661.850	1256260.579	8.953
1421	Electrical Line	CH:371+600 to CH:371+700_right	580652.426	1256375.236	8.344
1422	Electrical Line	CH:371+600 to CH:371+700_right	580646.239	1256369.788	8.619
1423	Electrical Line	CH:371+700 to CH:371+800_right	580644.304	1256460.826	7.930
1424	Electrical Line	CH:372+100 to CH:372+200_right	580603.760	1256832.917	7.156
1425	Electrical Line	CH:372+500 to CH:372+600_right	580505.236	1257248.492	6.568
1426	Electrical Line	CH:373+500 to CH:373+600_left	580019.856	1258127.788	8.430
1427	Electrical Line	CH:375+400 to CH:375+500_left	579114.094	1259744.310	14.493
1428	Electrical Line	CH:375+400 to CH:375+500_left	579098.553	1259755.336	14.054
1429	Electrical Line	CH:377+200 to CH:377+300_left	578217.117	1261336.968	7.848
1430	Electrical Line	CH:377+300 to CH:377+400_right	578194.210	1261382.687	8.471
1431	Electrical Line	CH:378+200 to CH:378+300_right	577715.652	1262227.076	10.984
1432	Electrical Line	CH:383+600 to CH:383+700_left	574537.270	1266559.765	10.452
1433	Electrical Line	CH:384+300 to CH:384+400_left	574054.154	1267062.312	13.148
1434	Electrical Line	CH:386+100 to CH:386+200_right	572508.117	1267796.613	8.941
1435	Electrical Line	CH:386+500 to CH:386+600_left	572139.319	1267962.986	7.323
1436	Electrical Line	CH:386+700 to CH:386+800_left	571930.310	1268122.954	8.223
1437	Electrical Line	CH:386+800 to CH:386+900_left	571899.000	1268144.034	9.779
1438	Electrical Line	CH:386+800 to CH:386+900_left	571851.189	1268174.845	10.989
1439	Electrical Line	CH:386+900 to CH:387+000_left	571778.664	1268243.470	10.815
1440	Electrical Line	CH:386+900 to CH:387+000_right	571813.779	1268230.462	10.607
1441	Electrical Line	CH:387+000 to CH:387+100_right	571728.751	1268317.958	7.491
1442	Electrical Line	CH:387+100 to CH:387+200_left	571642.238	1268370.613	7.832
1443	Electrical Line	CH:387+100 to CH:387+200_right	571675.921	1268378.330	7.964
1444	Electrical Line	CH:387+200 to CH:387+300_right	571619.946	1268440.221	7.838
1445	Electrical Line	CH:387+800 to CH:387+900_left	571257.974	1268983.933	14.534
1446	Electrical Line	CH:387+900 to CH:388+000_left	571238.936	1269023.660	13.367
1447	Electrical Line	CH:388+400 to CH:388+500_right	570994.834	1269530.921	11.155
1448	Electrical Line	CH:388+900 to CH:389+000_right	570772.220	1269922.924	6.703
1449	Electrical Line	CH:390+200 to CH:390+300_right	570150.907	1271105.978	6.209
1450	Electrical Line	CH:390+900 to CH:391+000_right	569849.497	1271702.079	11.692
1451	Electrical Line	CH:391+500 to CH:391+600_right	569548.789	1272279.699	8.849
1452	Electrical Line	CH:391+700 to CH:391+800_right	569470.122	1272440.692	10.359
1453	Electrical Line	CH:392+600 to CH:392+700_right	569062.834	1273201.573	6.524
1454	Electrical Line	CH:393+100 to CH:393+200_left	568792.956	1273651.557	15.725

1455	Electrical Line	CH:393+100 to CH:393+200_left	568820.609	1273635.412	12.648
1456	Electrical Line	CH:393+300 to CH:393+400_left	568706.727	1273841.029	14.547
1457	Electrical Line	CH:393+400 to CH:393+500_right	568702.351	1273915.685	12.539
1458	Electrical Line	CH:393+600 to CH:393+700_left	568578.471	1274106.618	11.199
1459	Electrical Line	CH:393+600 to CH:393+700_left	568550.805	1274127.553	11.316
1460	Electrical Line	CH:393+600 to CH:393+700_right	568592.052	1274088.579	10.933
1461	Electrical Line	CH:393+700 to CH:393+800_right	568550.131	1274187.130	10.873
1462	Electrical Line	CH:393+900 to CH:394+000_right	568425.299	1274402.787	10.718
1463	Electrical Line	CH:394+000 to CH:394+100_left	568369.755	1274477.479	9.642
1464	Electrical Line	CH:395+400 to CH:395+500_right	567766.103	1275677.839	18.667
1465	Electrical Line	CH:395+900 to CH:396+000_right	567518.466	1276136.867	19.278
1466	Electrical Line	CH:395+900 to CH:396+000_right	567508.478	1276159.255	20.505
1467	Electrical Line	CH:396+000 to CH:396+100_left	567469.103	1276225.579	18.249
1468	Electrical Line	CH:396+500 to CH:396+600_right	567277.648	1276730.279	12.204
1469	Electrical Line	CH:397+100 to CH:397+200_left	567171.523	1277261.900	6.983
1470	Electrical Line	CH:397+500 to CH:397+600_left	567191.781	1277641.342	12.354
1471	Electrical Line	CH:397+500 to CH:397+600_left	567194.274	1277703.865	11.734
1472	Electrical Line	CH:397+600 to CH:397+700_right	567221.808	1277801.874	13.005
1473	Electrical Line	CH:397+700 to CH:397+800_left	567232.203	1277902.975	20.386
1474	Electrical Line	CH:398+000 to CH:398+100_right	567293.073	1278198.503	12.941
1475	Electrical Line	CH:398+600 to CH:398+700_left	567372.945	1278739.633	6.096
1476	Electrical Line	CH:398+800 to CH:398+900_right	567421.224	1278935.401	7.483
1477	Electrical Line	CH:399+300 to CH:399+400_left	567503.384	1279440.157	7.639
1478	Electrical Line	CH:399+400 to CH:399+500_left	567512.649	1279505.392	7.358
1479	Electrical Line	CH:399+400 to CH:399+500_left	567507.561	1279501.468	8.343
1480	Electrical Line	CH:399+600 to CH:399+700_left	567550.618	1279716.396	12.556
1481	Electrical Line	CH:400+200 to CH:400+300_right	567673.518	1280351.778	16.489
1482	Electrical Line	CH:400+200 to CH:400+300_right	567681.367	1280355.814	17.527
1483	Electrical Line	CH:400+600 to CH:400+700_right	567740.534	1280754.660	24.865
1484	Electrical Line	CH:400+900 to CH:401+000_left	567735.621	1281016.682	15.075
1485	Electrical Line	CH:400+900 to CH:401+000_right	567761.077	1281000.608	16.227
1486	Electrical Line	CH:401+500 to CH:401+600_right	567692.629	1281593.504	19.444
1487	Electrical Line	CH:401+900 to CH:402+000_left	567518.796	1281986.654	24.182
1488	Electrical Line	CH:402+000 to CH:402+100_left	567467.112	1282115.465	18.144
1489	Electrical Line	CH:402+000 to CH:402+100_left	567508.237	1282036.674	25.090
1490	Electrical Line	CH:402+000 to CH:402+100_left	567511.728	1282046.511	23.323
1491	Electrical Line	CH:402+000 to CH:402+100_right	567521.394	1282060.340	22.881
1492	Electrical Line	CH:402+100 to CH:402+200_right	567448.019	1282163.260	19.406
1493	Electrical Line	CH:402+200 to CH:402+300_right	567383.445	1282282.307	18.464
1494	Electrical Line	CH:402+300 to CH:402+400_right	567341.609	1282325.555	13.168
1495	Electrical Line	CH:402+400 to CH:402+500_right	567259.654	1282437.208	12.982
1496	Electrical Line	CH:402+600 to CH:402+700_left	567130.723	1282562.116	12.501
1497	Electrical Line	CH:403+000 to CH:403+100_left	566867.210	1282797.463	9.229
1498	Electrical Line	CH:403+200 to CH:403+300_left	566656.924	1282991.620	10.899
1499	Electrical Line	CH:404+000 to CH:404+100_left	566064.731	1283513.693	11.805
1500	Electrical Line	CH:404+000 to CH:404+100_right	566079.458	1283518.341	10.562
1501	High Transmission Line	CH:404+100 to CH:404+200_right	566014.104	1283576.651	19.424
1502	High Transmission Line	CH:404+300 to CH:404+400_left	565846.760	1283705.913	17.535
1503	Electrical Line	CH:404+300 to CH:404+400_left	565866.409	1283703.096	9.145
1504	Electrical Line	CH:404+400 to CH:404+500_left	565818.576	1283739.771	11.831
1505	Electrical Line	CH:404+500 to CH:404+600_left	565713.778	1283837.707	9.990
1506	Electrical Line	CH:406+100 to CH:406+200_left	564552.534	1284869.115	12.511

1507	Electrical Line	CH:406+100 to CH:406+200_left	564553.715	1284869.740	14.963
1508	Electrical Line	CH:406+100 to CH:406+200_left	564490.827	1284914.920	13.091
1509	Electrical Line	CH:406+200 to CH:406+300_left	564452.468	1284969.975	11.142
1510	Electrical Line	CH:406+400 to CH:406+500_right	564309.530	1285125.392	9.448
1511	Electrical Line	CH:406+900 to CH:407+000_right	564033.151	1285488.827	9.512
1512	Electrical Line	CH:407+100 to CH:407+200_left	563901.838	1285677.489	10.483
1513	High Transmission Line	CH:407+100 to CH:407+200_right	563970.930	1285696.925	19.054
1514	Electrical Line	CH:407+200 to CH:407+300_left	563827.694	1285798.614	10.669
1515	Electrical Line	CH:407+600 to CH:407+700_right	563641.205	1286094.897	10.388
1516	Electrical Line	CH:407+700 to CH:407+800_left	563563.142	1286210.619	11.654
1517	Electrical Line	CH:407+700 to CH:407+800_left	563582.155	1286179.387	10.883
1518	Electrical Line	CH:407+700 to CH:407+800_left	563564.430	1286200.925	11.159
1519	Electrical Line	CH:407+900 to CH:408+000_right	563461.019	1286395.203	11.359
1520	Electrical Line	CH:408+000 to CH:408+100_left	563395.614	1286467.667	12.153
1521	Electrical Line	CH:408+000 to CH:408+100_right	563415.840	1286461.132	11.792
1522	Electrical Line	CH:408+300 to CH:408+400_left	563258.941	1286683.844	11.374
1523	Electrical Line	CH:408+300 to CH:408+400_left	563246.116	1286713.509	12.054
1524	Electrical Line	CH:408+400 to CH:408+500_right	563201.067	1286786.468	12.373
1525	Electrical Line	CH:408+500 to CH:408+600_left	563137.467	1286884.572	12.849
1526	Electrical Line	CH:408+500 to CH:408+600_right	563154.449	1286876.455	12.067
1527	Electrical Line	CH:408+700 to CH:408+800_left	563045.449	1287026.386	12.388
1528	Electrical Line	CH:408+900 to CH:409+000_left	562944.067	1287159.506	22.661
1529	Electrical Line	CH:408+900 to CH:409+000_left	562947.144	1287182.306	22.479
1530	Electrical Line	CH:409+000 to CH:409+100_right	562889.253	1287279.086	28.037
1531	Electrical Line	CH:409+000 to CH:409+100_right	562881.809	1287295.275	26.408
1532	Electrical Line	CH:409+200 to CH:409+300_left	562759.429	1287476.154	12.019
1533	Electrical Line	CH:409+200 to CH:409+300_right	562766.394	1287469.368	13.903
1534	Electrical Line	CH:409+400 to CH:409+500_left	562657.673	1287626.248	13.045
1535	Electrical Line	CH:409+600 to CH:409+700_right	562587.177	1287771.216	13.759
1536	Electrical Line	CH:409+600 to CH:409+700_right	562547.789	1287829.438	17.482
1537	Electrical Line	CH:417+300 to CH:417+400_left	559341.009	1294621.726	14.126
1538	Electrical Line	CH:417+400 to CH:417+500_left	559320.428	1294742.096	11.544
1539	Electrical Line	CH:417+400 to CH:417+500_left	559325.239	1294671.354	10.455
1540	Electrical Line	CH:417+600 to CH:417+700_left	559286.342	1294922.670	8.432
1541	Electrical Line	CH:417+600 to CH:417+700_right	559308.167	1294874.353	6.663
1542	Electrical Line	CH:417+600 to CH:417+700_right	559298.190	1294901.886	5.406
1543	Electrical Line	CH:417+800 to CH:417+900_right	559272.801	1295084.045	15.716
1544	Electrical Line	CH:418+000 to CH:418+100_right	559256.587	1295345.998	13.038
1545	Electrical Line	CH:418+100 to CH:418+200_left	559237.769	1295384.568	12.148
1546	Electrical Line	CH:418+300 to CH:418+400_left	559248.209	1295576.886	9.919
1547	Electrical Line	CH:418+300 to CH:418+400_left	559237.804	1295657.156	9.507
1548	Electrical Line	CH:418+300 to CH:418+400_right	559255.711	1295588.092	10.509
1549	Electrical Line	CH:418+600 to CH:418+700_right	559270.693	1295939.363	6.607
1550	Electrical Line	CH:418+800 to CH:418+900_left	559268.717	1296059.952	10.334
1551	Electrical Line	CH:419+000 to CH:419+100_right	559294.198	1296266.909	10.558
1552	Electrical Line	CH:419+200 to CH:419+300_left	559298.458	1296506.412	18.599
1553	Electrical Line	CH:419+400 to CH:419+500_left	559305.773	1296700.959	24.849
1554	Electrical Line	CH:419+500 to CH:419+600_left	559317.232	1296849.152	22.674
1555	Electrical Line	CH:419+500 to CH:419+600_right	559323.098	1296816.131	24.457
1556	Electrical Line	CH:419+600 to CH:419+700_left	559301.006	1296889.543	20.753
1557	Electrical Line	CH:419+600 to CH:419+700_right	559324.863	1296940.740	23.825
1558	Electrical Line	CH:419+700 to CH:419+800_right	559331.935	1296972.417	23.868

1559	Electrical Line	CH:419+800 to CH:419+900_left	559333.376	1297117.542	18.975
1560	Electrical Line	CH:420+100 to CH:420+200_left	559340.013	1297451.374	27.744
1561	Electrical Line	CH:420+100 to CH:420+200_right	559350.966	1297392.580	31.422
1562	Electrical Line	CH:420+400 to CH:420+500_right	559373.066	1297697.612	16.109
1563	Electrical Line	CH:420+500 to CH:420+600_right	559374.029	1297776.732	18.612
1564	Electrical Line	CH:420+600 to CH:420+700_left	559373.635	1297915.738	21.675
1565	Electrical Line	CH:420+600 to CH:420+700_right	559379.861	1297947.126	20.516
1566	Electrical Line	CH:420+600 to CH:420+700_right	559376.883	1297871.002	22.990
1567	Electrical Line	CH:420+700 to CH:420+800_right	559387.397	1297998.717	18.794
1568	Electrical Line	CH:420+900 to CH:421+000_left	559395.632	1298242.702	26.914
1569	Electrical Line	CH:421+100 to CH:421+200_left	559397.761	1298369.711	18.907
1570	Electrical Line	CH:421+200 to CH:421+300_right	559408.831	1298468.098	13.928
1571	Electrical Line	CH:421+400 to CH:421+500_left	559409.868	1298693.342	7.848
1572	Electrical Line	CH:421+600 to CH:421+700_left	559422.728	1298861.434	9.564
1573	Electrical Line	CH:421+800 to CH:421+900_right	559425.627	1299071.029	9.297
1574	Electrical Line	CH:422+300 to CH:422+400_right	559318.842	1299642.937	8.361
1575	Electrical Line	CH:422+400 to CH:422+500_right	559299.761	1299700.170	9.637
1576	Electrical Line	CH:423+000 to CH:423+100_right	559030.259	1300280.311	13.094
1577	Electrical Line	CH:423+300 to CH:423+400_right	558902.376	1300514.764	6.886
1578	Electrical Line	CH:423+500 to CH:423+600_left	558792.135	1300664.643	9.742
1579	Electrical Line	CH:423+600 to CH:423+700_right	558787.316	1300724.235	9.308
1580	Electrical Line	CH:423+800 to CH:423+900_left	558655.732	1300953.308	9.188
1581	Electrical Line	CH:423+800 to CH:423+900_left	558658.694	1300936.687	9.389
1582	Electrical Line	CH:424+200 to CH:424+300_right	558469.874	1301331.059	13.067
1583	Electrical Line	CH:424+400 to CH:424+500_right	558369.884	1301501.950	15.029
1584	High Transmission Line	CH:424+500 to CH:424+600_left	558322.729	1301523.923	25.168
1585	Electrical Line	CH:424+500 to CH:424+600_right	558361.777	1301524.019	15.058
1586	Electrical Line	CH:424+600 to CH:424+700_right	558307.791	1301621.601	12.485
1587	Electrical Line	CH:424+700 to CH:424+800_right	558246.907	1301738.227	13.118
1588	Electrical Line	CH:424+900 to CH:425+000_left	558137.576	1301922.342	15.258
1589	Electrical Line	CH:424+900 to CH:425+000_right	558149.918	1301914.401	14.907
1590	Electrical Line	CH:425+000 to CH:425+100_right	558145.786	1301987.548	13.292
1591	Electrical Line	CH:425+100 to CH:425+200_right	558069.054	1302074.230	14.165
1592	Electrical Line	CH:425+100 to CH:425+200_right	558056.301	1302124.184	14.661
1593	Electrical Line	CH:425+200 to CH:425+300_right	558008.057	1302203.996	21.726
1594	Electrical Line	CH:425+400 to CH:425+500_right	557925.622	1302338.356	23.754
1595	Electrical Line	CH:425+500 to CH:425+600_left	557878.276	1302395.397	17.797
1596	Electrical Line	CH:425+600 to CH:425+700_left	557803.799	1302563.706	16.877
1597	Electrical Line	CH:425+700 to CH:425+800_right	557795.691	1302625.149	18.521
1598	Electrical Line	CH:425+900 to CH:426+000_right	557687.522	1302799.827	24.193
1599	Electrical Line	CH:425+900 to CH:426+000_right	557680.493	1302803.344	33.115
1600	Electrical Line	CH:426+000 to CH:426+100_right	557627.140	1302914.380	24.620
1601	Electrical Line	CH:426+100 to CH:426+200_right	557590.266	1302986.751	19.924
1602	Electrical Line	CH:426+300 to CH:426+400_left	557501.726	1303137.089	14.089
1603	Electrical Line	CH:426+400 to CH:426+500_left	557449.540	1303238.643	11.759
1604	Electrical Line	CH:426+600 to CH:426+700_left	557375.000	1303378.488	15.737
1605	Electrical Line	CH:426+600 to CH:426+700_left	557328.612	1303438.025	12.780
1606	Electrical Line	CH:426+700 to CH:426+800_right	557315.048	1303498.264	13.330
1607	Electrical Line	CH:426+800 to CH:426+900_left	557245.831	1303612.410	12.317
1608	Electrical Line	CH:426+800 to CH:426+900_left	557240.738	1303624.056	11.057
1609	Electrical Line	CH:427+200 to CH:427+300_left	557085.384	1303913.740	17.436
1610	Electrical Line	CH:427+200 to CH:427+300_right	557054.468	1303973.467	10.960

1611	Electrical Line	CH:427+700 to CH:427+800_left	556735.734	1304375.382	14.416
1612	Electrical Line	CH:427+800 to CH:427+900_right	556674.513	1304447.283	21.051
1613	Electrical Line	CH:427+900 to CH:428+000_left	556619.555	1304491.033	22.297
1614	Electrical Line	CH:428+000 to CH:428+100_left	556523.982	1304572.393	11.458
1615	Electrical Line	CH:428+100 to CH:428+200_left	556517.912	1304599.437	11.219
1616	Electrical Line	CH:428+100 to CH:428+200_left	556470.887	1304656.695	13.090
1617	Electrical Line	CH:428+500 to CH:428+600_right	556236.817	1304924.504	19.794
1618	Electrical Line	CH:428+500 to CH:428+600_right	556239.757	1304926.351	18.078
1619	Electrical Line	CH:428+600 to CH:428+700_right	556133.499	1305021.674	23.434
1620	Electrical Line	CH:428+700 to CH:428+800_right	556109.498	1305055.889	28.734
1621	Electrical Line	CH:428+800 to CH:428+900_left	556035.819	1305122.103	22.523
1622	Electrical Line	CH:428+800 to CH:428+900_left	556001.915	1305158.859	24.826
1623	Electrical Line	CH:428+900 to CH:429+000_left	555921.567	1305232.532	33.815
1624	Electrical Line	CH:428+900 to CH:429+000_left	555920.483	1305244.671	36.417
1625	Electrical Line	CH:429+300 to CH:429+400_left	555686.273	1305479.566	13.263
1626	Electrical Line	CH:429+500 to CH:429+600_left	555530.243	1305649.770	22.419
1627	Electrical Line	CH:429+600 to CH:429+700_right	555492.419	1305705.214	22.147
1628	Electrical Line	CH:429+800 to CH:429+900_left	555323.033	1305860.706	16.028
1629	Electrical Line	CH:429+800 to CH:429+900_right	555340.312	1305877.377	16.041
1630	Electrical Line	CH:430+300 to CH:430+400_left	554989.562	1306217.509	22.897
1631	Electrical Line	CH:430+300 to CH:430+400_left	554984.712	1306210.158	19.850
1632	Electrical Line	CH:430+300 to CH:430+400_left	554987.076	1306211.805	20.783
1633	Electrical Line	CH:430+700 to CH:430+800_left	554639.435	1306504.330	19.052
1634	Electrical Line	CH:430+700 to CH:430+800_right	554658.195	1306498.035	17.592
1635	Electrical Line	CH:430+700 to CH:430+800_right	554668.436	1306508.408	16.669
1636	Electrical Line	CH:431+400 to CH:431+500_right	554036.248	1306843.659	10.255
1637	Electrical Line	CH:431+500 to CH:431+600_right	553956.620	1306870.367	10.996
1638	Electrical Line	CH:431+800 to CH:431+900_right	553702.491	1306952.057	6.623
1639	Electrical Line	CH:432+100 to CH:432+200_right	553376.078	1307021.802	5.077
1640	Electrical Line	CH:432+100 to CH:432+200_right	553348.419	1307036.236	6.620
1641	Electrical Line	CH:432+800 to CH:432+900_left	552722.880	1307158.028	5.939
1642	Electrical Line	CH:432+900 to CH:433+000_right	552581.337	1307190.878	6.192
1643	Electrical Line	CH:433+100 to CH:433+200_left	552380.674	1307228.858	26.320
1644	Electrical Line	CH:433+300 to CH:433+400_right	552223.248	1307268.922	18.579
1645	Electrical Line	CH:433+400 to CH:433+500_right	552099.816	1307293.640	20.780
1646	Electrical Line	CH:433+900 to CH:434+000_left	551650.446	1307385.146	25.710
1647	Electrical Line	CH:434+000 to CH:434+100_left	551572.445	1307394.412	26.974
1648	High Transmission Line	CH:434+200 to CH:434+300_right	551366.676	1307489.705	23.675
1649	Electrical Line	CH:434+400 to CH:434+500_right	551145.593	1307501.914	22.793
1650	Electrical Line	CH:434+400 to CH:434+500_right	551136.627	1307500.801	22.207
1651	Electrical Line	CH:434+500 to CH:434+600_left	551038.023	1307512.880	14.096
1652	Electrical Line	CH:435+000 to CH:435+100_right	550603.402	1307619.961	7.119
1653	Electrical Line	CH:435+100 to CH:435+200_right	550486.591	1307644.782	25.699
1654	Electrical Line	CH:435+200 to CH:435+300_right	550370.969	1307681.206	25.315
1655	Electrical Line	CH:435+400 to CH:435+500_right	550195.106	1307718.312	19.200
1656	Electrical Line	CH:435+500 to CH:435+600_left	550024.956	1307745.718	19.572
1657	Electrical Line	CH:435+800 to CH:435+900_right	549755.610	1307860.916	8.624
1658	Electrical Line	CH:436+000 to CH:436+100_left	549582.321	1307919.546	23.137
1659	Electrical Line	CH:436+100 to CH:436+200_left	549475.965	1307975.531	17.178
1660	Electrical Line	CH:436+700 to CH:436+800_right	549021.851	1308218.837	29.296
1661	Electrical Line	CH:437+100 to CH:437+200_left	548652.011	1308404.675	17.314
1662	Electrical Line	CH:437+100 to CH:437+200_right	548663.694	1308405.671	16.419

1663	Electrical Line	CH:437+300 to CH:437+400_right	548420.940	1308548.576	18.410
1664	Electrical Line	CH:437+500 to CH:437+600_left	548301.300	1308590.100	12.280
1665	Electrical Line	CH:437+600 to CH:437+700_left	548197.773	1308634.154	11.222
1666	Electrical Line	CH:437+700 to CH:437+800_left	548109.982	1308692.764	11.480
1667	Electrical Line	CH:438+200 to CH:438+300_right	547658.185	1308938.158	9.641
1668	Electrical Line	CH:438+300 to CH:438+400_right	547535.922	1309002.120	12.308
1669	Electrical Line	CH:438+500 to CH:438+600_right	547421.080	1309073.974	18.280
1670	Electrical Line	CH:438+600 to CH:438+700_left	547294.684	1309125.487	25.285
1671	Electrical Line	CH:438+800 to CH:438+900_left	547160.351	1309196.103	27.126
1672	Electrical Line	CH:438+800 to CH:438+900_right	547134.125	1309217.631	24.389
1673	Electrical Line	CH:438+900 to CH:439+000_left	547004.289	1309294.324	15.183
1674	Electrical Line	CH:439+200 to CH:439+300_right	546787.434	1309506.712	8.893
1675	Electrical Line	CH:439+400 to CH:439+500_left	546642.514	1309600.182	7.616
1676	Electrical Line	CH:439+400 to CH:439+500_right	546696.646	1309579.808	11.713
1677	Electrical Line	CH:439+500 to CH:439+600_left	546552.501	1309680.522	10.627
1678	Electrical Line	CH:439+800 to CH:439+900_right	546399.190	1309850.126	13.666
1679	Electrical Line	CH:440+600 to CH:440+700_right	545793.922	1310395.620	26.017
1680	Electrical Line	CH:440+700 to CH:440+800_left	545693.419	1310485.183	17.063
1681	Electrical Line	CH:441+200 to CH:441+300_right	545352.788	1310844.648	13.103
1682	Electrical Line	CH:441+200 to CH:441+300_right	545372.869	1310821.443	13.311
1683	Electrical Line	CH:442+300 to CH:442+400_right	544536.689	1311573.119	10.214
1684	Electrical Line	CH:442+400 to CH:442+500_right	544418.504	1311648.228	10.352
1685	Electrical Line	CH:442+500 to CH:442+600_right	544397.823	1311658.155	10.720
1686	Electrical Line	CH:442+900 to CH:443+000_right	543988.423	1311837.821	8.933
1687	Electrical Line	CH:443+000 to CH:443+100_right	543931.470	1311870.072	7.557
1688	Electrical Line	CH:443+000 to CH:443+100_right	543952.187	1311849.747	11.124
1689	Electrical Line	CH:443+000 to CH:443+100_right	543946.299	1311856.263	8.810
1690	Electrical Line	CH:443+700 to CH:443+800_right	543211.143	1311992.034	9.827
1691	Electrical Line	CH:444+000 to CH:444+100_left	542946.008	1311984.844	10.454
1692	Electrical Line	CH:444+300 to CH:444+400_left	542666.095	1311978.778	9.789
1693	Electrical Line	CH:444+400 to CH:444+500_right	542537.070	1311983.486	8.070
1694	Electrical Line	CH:444+500 to CH:444+600_right	542392.716	1311960.686	9.500
1695	Electrical Line	CH:444+700 to CH:444+800_left	542240.949	1311911.126	8.231
1696	Electrical Line	CH:444+700 to CH:444+800_left	542251.030	1311925.412	9.109
1697	Electrical Line	CH:444+900 to CH:445+000_left	542071.773	1311857.598	15.438
1698	Electrical Line	CH:444+900 to CH:445+000_left	542047.603	1311852.921	14.615
1699	Electrical Line	CH:445+000 to CH:445+100_right	541954.260	1311828.712	10.938
1700	Electrical Line	CH:445+500 to CH:445+600_right	541489.941	1311676.975	15.530
1701	Electrical Line	CH:445+800 to CH:445+900_left	541195.318	1311672.879	8.874
1702	Electrical Line	CH:445+800 to CH:445+900_right	541209.998	1311675.103	11.580
1703	Electrical Line	CH:446+000 to CH:446+100_right	541015.300	1311740.295	8.977
1704	Electrical Line	CH:446+500 to CH:446+600_left	540606.259	1312032.577	9.003
1705	Electrical Line	CH:446+500 to CH:446+600_left	540596.079	1312039.257	8.628
1706	Electrical Line	CH:446+500 to CH:446+600_right	540583.034	1312059.733	9.712
1707	Electrical Line	CH:447+300 to CH:447+400_right	539986.291	1312643.213	20.861
1708	Electrical Line	CH:447+400 to CH:447+500_right	539933.067	1312700.605	19.143
1709	Electrical Line	CH:447+500 to CH:447+600_right	539883.814	1312752.616	17.715
1710	Electrical Line	CH:449+300 to CH:449+400_right	539312.909	1314408.959	18.136
1711	Electrical Line	CH:450+600 to CH:450+700_right	538916.509	1315656.434	19.688
1712	Electrical Line	CH:451+200 to CH:451+300_right	538706.364	1316205.800	26.267
1713	Electrical Line	CH:451+300 to CH:451+400_right	538648.516	1316369.375	29.294
1714	Electrical Line	CH:451+400 to CH:451+500_right	538641.505	1316453.514	26.316

1715	Electrical Line	CH:451+400 to CH:451+500_right	538636.461	1316398.974	27.899
1716	Electrical Line	CH:451+700 to CH:451+800_left	538521.130	1316673.217	26.070
1717	Electrical Line	CH:452+900 to CH:453+000_left	537845.405	1317706.622	7.861
1718	Electrical Line	CH:453+200 to CH:453+300_left	537764.241	1317957.046	11.147
1719	Electrical Line	CH:453+200 to CH:453+300_left	537746.003	1317977.123	10.726
1720	Electrical Line	CH:453+300 to CH:453+400_right	537735.407	1318111.248	15.007
1721	High Transmission Line	CH:453+400 to CH:453+500_left	537708.498	1318185.988	25.776
1722	Electrical Line	CH:453+400 to CH:453+500_left	537713.561	1318182.644	13.364
1723	Electrical Line	CH:454+800 to CH:454+900_right	537809.608	1319612.814	6.150
1724	Electrical Line	CH:454+800 to CH:454+900_right	537806.161	1319561.898	6.432
1725	Electrical Line	CH:455+000 to CH:455+100_left	537817.538	1319795.017	7.750
1726	Electrical Line	CH:455+000 to CH:455+100_right	537817.755	1319752.010	7.461
1727	Electrical Line	CH:455+100 to CH:455+200_right	537820.346	1319835.960	8.165
1728	Electrical Line	CH:456+800 to CH:456+900_right	537140.155	1321363.185	8.417
1729	Electrical Line	CH:458+200 to CH:458+300_left	536242.245	1322430.717	10.852
1730	Electrical Line	CH:458+400 to CH:458+500_right	536114.276	1322601.455	12.544
1731	Electrical Line	CH:461+800 to CH:461+900_left	533888.156	1325235.599	8.752
1732	Electrical Line	CH:461+800 to CH:461+900_right	533901.739	1325230.046	10.030
1733	Electrical Line	CH:462+000 to CH:462+100_left	533808.257	1325332.056	8.369
1734	Electrical Line	CH:462+000 to CH:462+100_left	533770.414	1325377.390	8.540
1735	Electrical Line	CH:462+700 to CH:462+800_right	533331.487	1325853.243	7.818
1736	Electrical Line	CH:462+700 to CH:462+800_right	533342.604	1325867.310	7.873
1737	Electrical Line	CH:462+800 to CH:462+900_right	533254.258	1325917.269	6.211
1738	Electrical Line	CH:462+900 to CH:463+000_left	533128.745	1325990.193	7.974
1739	Electrical Line	CH:462+900 to CH:463+000_right	533119.414	1326017.971	7.070
1740	Electrical Line	CH:463+200 to CH:463+300_right	532841.042	1326157.845	8.353
1741	Electrical Line	CH:463+300 to CH:463+400_left	532793.346	1326154.812	12.260
1742	Electrical Line	CH:463+900 to CH:464+000_left	532215.127	1326311.254	6.491
1743	Electrical Line	CH:464+000 to CH:464+100_left	532135.933	1326327.132	7.570
1744	Electrical Line	CH:464+000 to CH:464+100_right	532067.562	1326355.844	7.505
1745	Electrical Line	CH:464+000 to CH:464+100_right	532096.648	1326348.165	7.229
1746	Electrical Line	CH:464+000 to CH:464+100_right	532125.693	1326341.176	7.123
1747	Electrical Line	CH:464+200 to CH:464+300_right	531949.091	1326402.284	6.488
1748	Electrical Line	CH:464+300 to CH:464+400_right	531811.473	1326475.524	5.851
1749	Electrical Line	CH:464+500 to CH:464+600_left	531624.270	1326567.198	6.786
1750	Electrical Line	CH:467+500 to CH:467+600_left	529767.977	1328825.751	6.576
1751	Electrical Line	CH:467+500 to CH:467+600_right	529765.052	1328846.177	4.553
1752	Electrical Line	CH:467+800 to CH:467+900_left	529568.565	1329070.194	4.382
1753	Electrical Line	CH:468+300 to CH:468+400_left	529272.154	1329458.367	7.140
1754	High Transmission Line	CH:468+500 to CH:468+600_right	529180.324	1329639.262	9.773
1755	Electrical Line	CH:468+600 to CH:468+700_right	529065.955	1329692.060	8.071
1756	Electrical Line	CH:468+700 to CH:468+800_left	528955.799	1329799.156	19.404
1757	Electrical Line	CH:468+700 to CH:468+800_right	528956.485	1329805.148	17.530
1758	Electrical Line	CH:468+800 to CH:468+900_left	528889.425	1329861.040	26.527
1759	Electrical Line	CH:469+000 to CH:469+100_right	528769.947	1330005.964	36.951
1760	Electrical Line	CH:469+200 to CH:469+300_right	528654.922	1330125.679	48.993
1761	Electrical Line	CH:469+300 to CH:469+400_left	528543.542	1330228.599	46.451
1762	Electrical Line	CH:469+600 to CH:469+700_left	528340.189	1330432.160	42.565
1763	Electrical Line	CH:469+900 to CH:470+000_left	528123.574	1330657.630	43.323
1764	Electrical Line	CH:470+000 to CH:470+100_left	528050.917	1330722.906	43.727
1765	Electrical Line	CH:470+100 to CH:470+200_right	527999.433	1330810.270	47.090
1766	Electrical Line	CH:470+800 to CH:470+900_left	527493.940	1331306.699	34.359

1767	Electrical Line	CH:471+000 to CH:471+100_left	527402.952	1331412.885	5.814
1768	Electrical Line	CH:471+900 to CH:472+000_right	526894.814	1332137.531	7.990
1769	Electrical Line	CH:472+000 to CH:472+100_right	526844.323	1332266.319	41.019
1770	Electrical Line	CH:472+200 to CH:472+300_left	526716.893	1332372.898	7.582
1771	Electrical Line	CH:472+200 to CH:472+300_left	526668.478	1332453.566	5.741
1772	Electrical Line	CH:472+600 to CH:472+700_left	526466.037	1332743.308	9.355
1773	Electrical Line	CH:472+600 to CH:472+700_right	526507.427	1332719.458	6.004
1774	Electrical Line	CH:473+400 to CH:473+500_left	526023.168	1333410.539	6.780
1775	Electrical Line	CH:473+500 to CH:473+600_right	525975.991	1333486.863	7.843
1776	Electrical Line	CH:473+700 to CH:473+800_left	525819.998	1333692.241	9.413
1777	Electrical Line	CH:473+700 to CH:473+800_left	525843.057	1333661.137	9.706
1778	Electrical Line	CH:473+700 to CH:473+800_right	525870.617	1333643.923	8.312
1779	Electrical Line	CH:474+400 to CH:474+500_right	525346.034	1334116.748	6.374
1780	Electrical Line	CH:475+000 to CH:475+100_right	524769.349	1334397.956	7.570
1781	Electrical Line	CH:477+300 to CH:477+400_left	522672.365	1335349.328	5.103
1782	Electrical Line	CH:477+500 to CH:477+600_right	522502.218	1335444.564	6.208
1783	Electrical Line	CH:477+500 to CH:477+600_right	522525.332	1335430.974	5.951
1784	Electrical Line	CH:477+700 to CH:477+800_right	522329.332	1335547.513	7.254
1785	Electrical Line	CH:478+000 to CH:478+100_right	522120.789	1335663.896	7.264
1786	Electrical Line	CH:478+500 to CH:478+600_left	521722.772	1336029.748	7.508
1787	Electrical Line	CH:478+500 to CH:478+600_right	521749.869	1336008.378	8.200
1788	Electrical Line	CH:478+500 to CH:478+600_right	521741.479	1336016.936	7.828
1789	Electrical Line	CH:478+700 to CH:478+800_left	521615.882	1336171.253	7.317
1790	Electrical Line	CH:478+700 to CH:478+800_right	521632.283	1336166.974	6.579
1791	Electrical Line	CH:478+800 to CH:478+900_left	521537.803	1336275.383	6.513
1792	Electrical Line	CH:478+900 to CH:479+000_left	521482.794	1336386.131	6.868
1793	Electrical Line	CH:478+900 to CH:479+000_right	521507.419	1336370.874	5.294
1794	Electrical Line	CH:479+100 to CH:479+200_right	521417.200	1336566.759	4.566
1795	Electrical Line	CH:479+300 to CH:479+400_right	521356.776	1336716.550	5.437
1796	Electrical Line	CH:480+000 to CH:480+100_left	521075.878	1337353.761	7.057
1797	Electrical Line	CH:480+000 to CH:480+100_left	521083.884	1337321.447	7.725
1798	Electrical Line	CH:480+200 to CH:480+300_right	521002.197	1337569.144	7.036
1799	Electrical Line	CH:480+300 to CH:480+400_left	520964.875	1337597.436	8.926
1800	Electrical Line	CH:481+200 to CH:481+300_right	520635.669	1338499.779	8.132
1801	Electrical Line	CH:481+300 to CH:481+400_right	520589.518	1338595.370	5.780
1802	Electrical Line	CH:481+400 to CH:481+500_right	520576.350	1338653.740	5.058
1803	Electrical Line	CH:481+500 to CH:481+600_left	520532.553	1338721.781	5.862
1804	Electrical Line	CH:482+200 to CH:482+300_left	520271.527	1339380.628	6.893
1805	Electrical Line	CH:482+200 to CH:482+300_right	520271.939	1339419.539	5.106
1806	Electrical Line	CH:482+300 to CH:482+400_left	520221.873	1339506.008	6.636
1807	Electrical Line	CH:482+500 to CH:482+600_left	520140.898	1339702.281	8.673
1808	Electrical Line	CH:484+100 to CH:484+200_right	519471.573	1341160.666	10.980
1809	Electrical Line	CH:484+200 to CH:484+300_right	519451.832	1341201.341	10.216
1810	Electrical Line	CH:484+500 to CH:484+600_right	519303.355	1341535.661	10.840
1811	Electrical Line	CH:484+600 to CH:484+700_right	519303.375	1341568.727	10.591
1812	Electrical Line	CH:484+600 to CH:484+700_right	519284.839	1341583.034	11.042
1813	Electrical Line	CH:484+800 to CH:484+900_right	519220.972	1341832.973	9.321
1814	Electrical Line	CH:487+200 to CH:487+300_right	519004.494	1344164.628	9.784
1815	Electrical Line	CH:493+400 to CH:493+500_right	516991.227	1349933.215	7.978
1816	Electrical Line	CH:493+500 to CH:493+600_left	516946.705	1350027.892	8.043
1817	Electrical Line	CH:493+600 to CH:493+700_right	516933.241	1350065.381	7.764
1818	Electrical Line	CH:493+900 to CH:494+000_left	516797.929	1350395.333	10.287

1819	Electrical Line	CH:494+100 to CH:494+200_left	516729.896	1350556.354	10.298
1820	Electrical Line	CH:496+000 to CH:496+100_right	516195.754	1352384.006	7.783
1821	Electrical Line	CH:496+100 to CH:496+200_right	516184.974	1352424.379	8.177
1822	Electrical Line	CH:496+600 to CH:496+700_right	516054.466	1352913.773	9.504
1823	Electrical Line	CH:496+800 to CH:496+900_left	515992.702	1353090.153	6.815
1824	Electrical Line	CH:497+200 to CH:497+300_right	515813.935	1353513.005	7.037
1825	Electrical Line	CH:497+800 to CH:497+900_right	515432.423	1354008.061	13.038
1826	Electrical Line	CH:498+000 to CH:498+100_left	515338.694	1354131.860	15.127
1827	Electrical Line	CH:498+000 to CH:498+100_right	515332.421	1354149.128	13.902
1828	Electrical Line	CH:498+200 to CH:498+300_left	515211.513	1354292.933	17.455
1829	Electrical Line	CH:499+200 to CH:499+300_right	514597.493	1355149.189	16.335
1830	Electrical Line	CH:499+400 to CH:499+500_right	514508.765	1355287.589	12.805
1831	Electrical Line	CH:499+900 to CH:500+000_right	514143.978	1355645.535	9.435
1832	Electrical Line	CH:500+200 to CH:500+300_right	513914.283	1355794.189	10.857
1833	Electrical Line	CH:500+700 to CH:500+800_left	513417.051	1355967.460	13.394
1834	Electrical Line	CH:500+800 to CH:500+900_left	513377.618	1355976.141	12.201
1835	Electrical Line	CH:501+700 to CH:501+800_left	512497.642	1356264.415	7.777
1836	Electrical Line	CH:501+800 to CH:501+900_left	512422.670	1356317.444	7.757
1837	Electrical Line	CH:501+800 to CH:501+900_right	512405.340	1356342.685	8.580
1838	Electrical Line	CH:501+900 to CH:502+000_left	512350.540	1356372.809	8.950
1839	Electrical Line	CH:502+000 to CH:502+100_right	512275.631	1356434.743	9.494
1840	Electrical Line	CH:502+100 to CH:502+200_right	512164.383	1356547.964	12.049
1841	Electrical Line	CH:503+800 to CH:503+900_left	511281.375	1357966.180	9.709
1842	Electrical Line	CH:503+800 to CH:503+900_right	511279.182	1357998.513	10.254
1843	Electrical Line	CH:503+800 to CH:503+900_right	511306.292	1357922.603	9.862
1844	Electrical Line	CH:503+900 to CH:504+000_left	511254.534	1358015.066	9.294
1845	Electrical Line	CH:506+900 to CH:507+000_right	509814.188	1360653.243	10.606
1846	Electrical Line	CH:507+300 to CH:507+400_right	509650.683	1361045.967	9.954
1847	Electrical Line	CH:507+300 to CH:507+400_right	509663.334	1361012.188	9.824
1848	Electrical Line	CH:507+400 to CH:507+500_left	509590.240	1361139.308	9.963
1849	Electrical Line	CH:507+400 to CH:507+500_left	509581.202	1361161.665	10.663
1850	Electrical Line	CH:507+400 to CH:507+500_left	509572.351	1361179.015	9.641
1851	Electrical Line	CH:507+500 to CH:507+600_right	509560.961	1361216.111	9.625
1852	Electrical Line	CH:508+600 to CH:508+700_left	509119.536	1362219.342	11.715
1853	Electrical Line	CH:509+500 to CH:509+600_left	508759.579	1363047.584	8.765
1854	Electrical Line	CH:510+200 to CH:510+300_right	508469.884	1363714.439	10.429
1855	Electrical Line	CH:514+200 to CH:514+300_right	506440.922	1367062.220	6.259
1856	Electrical Line	CH:514+200 to CH:514+300_right	506401.392	1367114.561	8.271
1857	Electrical Line	CH:518+200 to CH:518+300_right	504200.534	1370367.367	10.168
1858	Electrical Line	CH:518+300 to CH:518+400_left	504140.276	1370396.663	13.446
1859	Electrical Line	CH:518+300 to CH:518+400_right	504130.239	1370473.971	16.108
1860	Electrical Line	CH:518+500 to CH:518+600_left	504003.743	1370618.694	15.701
1861	Electrical Line	CH:518+800 to CH:518+900_left	503811.912	1370857.561	16.619
1862	Electrical Line	CH:518+900 to CH:519+000_left	503754.337	1370950.925	22.475
1863	Electrical Line	CH:518+900 to CH:519+000_left	503748.751	1370869.918	19.544
1864	Electrical Line	CH:518+900 to CH:519+000_left	503802.605	1370880.141	19.158
1865	Electrical Line	CH:518+900 to CH:519+000_left	503733.562	1370926.540	22.374
1866	Electrical Line	CH:518+900 to CH:519+000_right	503766.016	1370947.102	22.510
1867	Electrical Line	CH:518+900 to CH:519+000_right	503780.196	1370954.846	25.505
1868	Electrical Line	CH:519+200 to CH:519+300_right	503589.521	1371206.984	24.312
1869	Electrical Line	CH:520+200 to CH:520+300_left	503200.840	1372060.546	12.165
1870	Electrical Line	CH:520+300 to CH:520+400_right	503203.577	1372176.369	13.724

1871	Electrical Line	CH:521+000 to CH:521+100_right	503178.767	1372917.474	13.083
1872	Electrical Line	CH:521+200 to CH:521+300_right	503187.661	1373060.221	15.208
1873	Electrical Line	CH:521+600 to CH:521+700_left	503155.811	1373435.845	15.660
1874	Electrical Line	CH:521+900 to CH:522+000_left	503102.766	1373725.227	8.565
1875	Electrical Line	CH:522+000 to CH:522+100_right	503058.506	1373903.026	13.220
1876	Electrical Line	CH:522+400 to CH:522+500_left	502878.167	1374263.449	15.647
1877	Electrical Line	CH:522+400 to CH:522+500_left	502905.682	1374212.580	13.161
1878	Electrical Line	CH:522+500 to CH:522+600_left	502880.037	1374270.445	14.169
1879	Electrical Line	CH:522+500 to CH:522+600_left	502874.375	1374292.053	15.712
1880	Electrical Line	CH:522+500 to CH:522+600_right	502869.305	1374312.382	15.485
1881	Electrical Line	CH:522+600 to CH:522+700_right	502829.321	1374377.843	19.214
1882	Electrical Line	CH:522+700 to CH:522+800_left	502765.839	1374436.617	21.761
1883	Electrical Line	CH:522+800 to CH:522+900_right	502675.340	1374586.835	25.923
1884	Electrical Line	CH:522+800 to CH:522+900_right	502671.022	1374601.771	25.185
1885	Electrical Line	CH:522+900 to CH:523+000_left	502615.063	1374629.546	23.966
1886	Electrical Line	CH:522+900 to CH:523+000_right	502622.323	1374680.733	24.326
1887	Electrical Line	CH:523+000 to CH:523+100_left	502574.328	1374683.795	24.904
1888	Electrical Line	CH:523+200 to CH:523+300_left	502404.590	1374861.869	18.755
1889	Electrical Line	CH:523+500 to CH:523+600_left	502225.568	1375029.786	21.563
1890	Electrical Line	CH:523+700 to CH:523+800_left	502026.315	1375220.600	20.024
1891	Electrical Line	CH:523+800 to CH:523+900_right	502007.533	1375243.956	19.852
1892	Electrical Line	CH:524+100 to CH:524+200_left	501733.883	1375491.992	13.993
1893	Electrical Line	CH:524+100 to CH:524+200_left	501746.545	1375480.776	14.763
1894	Electrical Line	CH:524+200 to CH:524+300_left	501722.731	1375500.046	15.590
1895	Electrical Line	CH:524+300 to CH:524+400_left	501640.774	1375581.636	13.515
1896	Electrical Line	CH:524+400 to CH:524+500_right	501591.778	1375654.901	14.672
1897	Electrical Line	CH:524+500 to CH:524+600_right	501506.161	1375710.669	19.568
1898	Electrical Line	CH:524+600 to CH:524+700_right	501416.051	1375793.963	24.751
1899	Electrical Line	CH:525+100 to CH:525+200_left	501021.662	1376152.521	23.817
1900	Electrical Line	CH:525+300 to CH:525+400_left	500879.650	1376291.956	27.236
1901	Electrical Line	CH:525+300 to CH:525+400_left	500902.104	1376233.400	26.739
1902	Electrical Line	CH:525+500 to CH:525+600_left	500742.352	1376409.708	20.502
1903	Electrical Line	CH:525+600 to CH:525+700_right	500638.295	1376532.046	15.301
1904	Electrical Line	CH:525+800 to CH:525+900_right	500509.567	1376645.090	9.203
1905	Electrical Line	CH:526+100 to CH:526+200_left	500291.345	1376841.927	16.993
1906	Electrical Line	CH:526+400 to CH:526+500_left	500107.782	1377079.717	26.713
1907	Electrical Line	CH:526+400 to CH:526+500_right	500135.417	1377047.220	23.444
1908	Electrical Line	CH:526+500 to CH:526+600_right	500075.105	1377134.945	33.210
1909	Electrical Line	CH:526+600 to CH:526+700_right	500037.977	1377228.207	43.300
1910	Electrical Line	CH:526+800 to CH:526+900_right	499921.638	1377420.656	18.312
1911	Electrical Line	CH:526+900 to CH:527+000_left	499867.492	1377544.267	13.266
1912	Electrical Line	CH:527+000 to CH:527+100_left	499845.036	1377604.735	14.978
1913	Electrical Line	CH:527+300 to CH:527+400_left	499768.585	1377918.552	10.372
1914	Electrical Line	CH:527+300 to CH:527+400_right	499785.350	1377898.521	12.354
1915	Electrical Line	CH:527+300 to CH:527+400_right	499777.478	1377905.218	12.207
1916	Electrical Line	CH:527+400 to CH:527+500_right	499789.216	1377952.601	10.952
1917	Electrical Line	CH:527+600 to CH:527+700_right	499747.291	1378155.298	6.414
1918	Electrical Line	CH:527+600 to CH:527+700_right	499732.443	1378171.461	7.058
1919	Electrical Line	CH:527+700 to CH:527+800_right	499705.897	1378320.977	7.490
1920	Electrical Line	CH:527+700 to CH:527+800_right	499724.135	1378324.980	6.681
1921	Electrical Line	CH:527+700 to CH:527+800_right	499734.022	1378343.534	4.969
1922	Electrical Line	CH:527+800 to CH:527+900_right	499689.620	1378389.623	5.900

1923	Electrical Line	CH:528+700 to CH:528+800_left	499521.607	1379239.789	6.908
1924	Electrical Line	CH:528+700 to CH:528+800_left	499526.481	1379234.841	6.922
1925	Electrical Line	CH:528+900 to CH:529+000_right	499460.387	1379445.501	6.271
1926	Electrical Line	CH:529+100 to CH:529+200_left	499359.314	1379614.925	7.823
1927	Electrical Line	CH:529+200 to CH:529+300_left	499279.882	1379705.127	21.493
1928	Electrical Line	CH:529+300 to CH:529+400_left	499221.921	1379760.154	22.696
1929	Electrical Line	CH:529+500 to CH:529+600_left	499064.899	1379905.108	8.085
1930	Electrical Line	CH:529+600 to CH:529+700_left	498985.081	1379987.414	13.674
1931	Electrical Line	CH:529+700 to CH:529+800_left	498923.411	1380064.279	22.421
1932	Electrical Line	CH:530+000 to CH:530+100_left	498813.206	1380288.360	16.781
1933	Electrical Line	CH:530+100 to CH:530+200_right	498756.942	1380414.948	10.681
1934	Electrical Line	CH:530+200 to CH:530+300_left	498730.646	1380461.946	8.285
1935	Electrical Line	CH:530+200 to CH:530+300_right	498715.793	1380519.531	8.677
1936	Electrical Line	CH:530+400 to CH:530+500_right	498649.709	1380654.593	7.864
1937	Electrical Line	CH:530+900 to CH:531+000_right	498406.666	1381159.178	13.123
1938	Electrical Line	CH:531+100 to CH:531+200_left	498306.528	1381338.786	9.365
1939	Electrical Line	CH:531+400 to CH:531+500_left	498205.433	1381562.170	5.510
1940	Electrical Line	CH:531+500 to CH:531+600_right	498116.546	1381715.649	7.439
1941	Electrical Line	CH:531+500 to CH:531+600_right	498162.727	1381650.431	6.288
1942	Electrical Line	CH:531+500 to CH:531+600_right	498133.558	1381686.826	5.760
1943	Electrical Line	CH:531+500 to CH:531+600_right	498124.812	1381697.925	6.949
1944	Electrical Line	CH:531+800 to CH:531+900_left	497898.221	1381878.080	11.123
1945	Electrical Line	CH:531+800 to CH:531+900_left	497888.618	1381882.677	11.803
1946	Electrical Line	CH:531+900 to CH:532+000_left	497827.644	1381919.062	12.875
1947	Electrical Line	CH:532+000 to CH:532+100_left	497710.265	1382003.037	13.043
1948	Electrical Line	CH:532+200 to CH:532+300_right	497568.615	1382128.862	8.114
1949	Electrical Line	CH:532+300 to CH:532+400_left	497491.396	1382150.987	7.401
1950	Electrical Line	CH:532+300 to CH:532+400_left	497480.949	1382164.405	8.384
1951	Electrical Line	CH:532+300 to CH:532+400_left	497477.632	1382176.968	14.135
1952	Electrical Line	CH:532+400 to CH:532+500_left	497399.398	1382240.338	7.476
1953	Electrical Line	CH:532+600 to CH:532+700_right	497333.779	1382341.722	6.653
1954	Electrical Line	CH:532+600 to CH:532+700_right	497333.491	1382366.171	6.996
1955	Electrical Line	CH:532+900 to CH:533+000_right	497200.145	1382661.983	7.378
1956	Electrical Line	CH:533+200 to CH:533+300_right	497097.030	1382934.029	6.050
1957	Electrical Line	CH:533+300 to CH:533+400_left	497034.818	1383027.415	9.454
1958	Electrical Line	CH:533+500 to CH:533+600_right	496982.153	1383205.468	8.035

DETAIL/LIST OF BRIDGES

Details of existing bridges along the alignment

S.No	Chainage	Type of bridge			Existing details			
		ROB/ RUB/ Subway/ River/ Nalla/ Canal/ lake/ Pond/ FOB			Span details for all spans	*Skew angle	Squire width	Type of Structure (Steel/ RCC/ Arch etc)
		Type	Name (River/ NH/SH/ etc)	Parallel or Crossing				
1	7+214	ROB	Road and Rail	Crossing	14	59.8	138.2x11.8	RCC/Steel
2	160+913	ROB	Canal	Crossing	19	77.87	122.9x3.0	RCC
3	179+137	ROB	Canal	Crossing	1	46.62	4.2x1.0	RCC
4	205+723	ROB	Road	Crossing	NA	66.39	7.15x1.52	NA
5	209+247	ROB	Road	Parallel	1	9.09	6.92x0.6	RCC
6	211+266	ROB	Canal	Crossing	1	87.67	5.16x3.17	RCC
7	211+348	ROB	Canal	Crossing	1	79.07	5.38x4.23	RCC
8	260+314	ROB	Rail	Crossing	1	80.76	21.93x8.43	RCC
9	260+818	ROB	Rail	Crossing	1	89.8	19.76x10.09	RCC
10	260+824	ROB	Rail	Crossing	1	88.5	13.07x1.86	RCC
11	269+157	ROB	Ditch	Crossing	1	44.79	3.90x2.15	RCC
12	319+763	ROB	Rail	Crossing	12	35.08	220.34x10.23	RCC
13	322+800	ROB	Rail	Crossing	12	47.21	166.53x8.61	RCC
14	333+500	ROB	Rail	Crossing	18	44.39	202.44x12.10	RCC
15	353+300	ROB	Rail	Crossing	12	32.92	203.93x10.53	RCC
16	355+500	ROB	Rail	Crossing	16	89.15	122.42x8.27	Steel/RCC

17	358+900	ROB	Rail	Crossing	3	73.48	125.58x11.01	RCC
18	359+800	ROB	Rail	Crossing	12	72.21	127.5x12.12	RCC
19	365+500	ROB	Rail	Crossing	1	82.84	28.33x13.40	RCC
20	366+680	ROB	Rail and Road	Crossing	7	28.83	251.30x12.04	RCC
21	379+234	ROB	Rail	Crossing	15	30.31	224.13x12.30	RCC
22	381+525	ROB	Rail	Crossing	1	89.88	118.35x11.88	RCC
23	403+010	ROB	Canal	Crossing	1	76.57	2.95x1.65	RCC
24	404+560	ROB	Canal	Crossing	1	88.88	6.60x1.43	RCC
25	451+756	ROB	Road	Parallel	1	2.02	2.77x0.52	RCC
26	452+351	ROB	Rail	Crossing	1	87.24	42.75x9.56	RCC
27	462+317	ROB	Ditch	Crossing	1	87.71	4.97x0.28	RCC
28	462+323	ROB	Ditch	Crossing	1	86.55	4.00x0.28	RCC
29	465+832	ROB	Canal	Crossing	NA	85.09	4.00x0.99	NA
30	494+807	ROB	Ditch	Crossing	1	86.12	4.00x0.35	RCC
31	494+807	ROB	Ditch	Crossing	1	86.12	4.00x0.35	RCC
32	495+076	ROB	Ditch	Crossing	1	80.32	2.25x.20	RCC
33	495+076	ROB	Ditch	Crossing	1	80.32	2.25x.20	RCC
34	495+445	ROB	Canal	Crossing	2	57.65	3.38x0.73	Steel
35	498+651	ROB	Road	Crossing	1	84.49	1.74x1.50	RCC
36	499+300	ROB	Rail	Crossing	12	89.81	127.92x8.28	RCC
37	502+100	ROB	Rail	Crossing	12	25.64	307.83x11.85	RCC
38	517+800	ROB	Rail	Crossing	10	31.5	278.91x11.79	RCC
39	532+400	ROB	River	Crossing	1	51.94	45.04x10.99	RCC

DGPS SURVEY REPORT

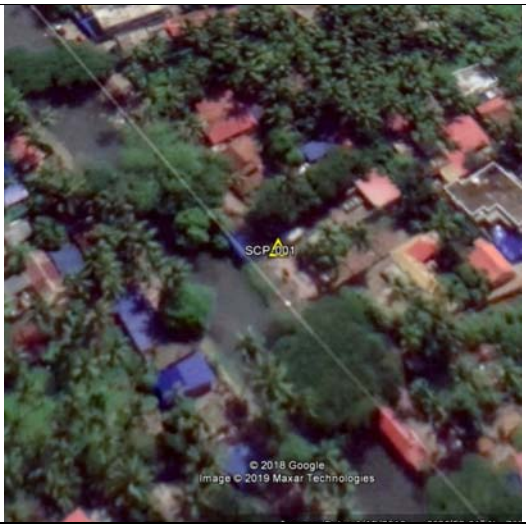
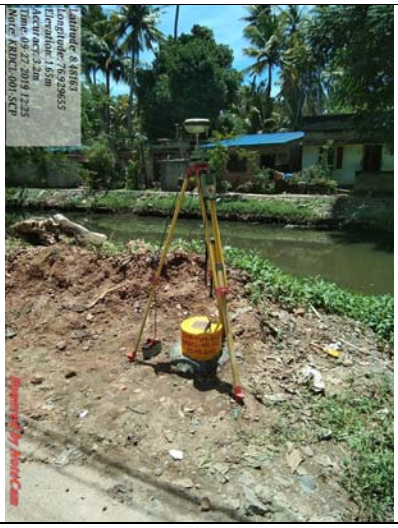
DGPS SURVEY REPORT

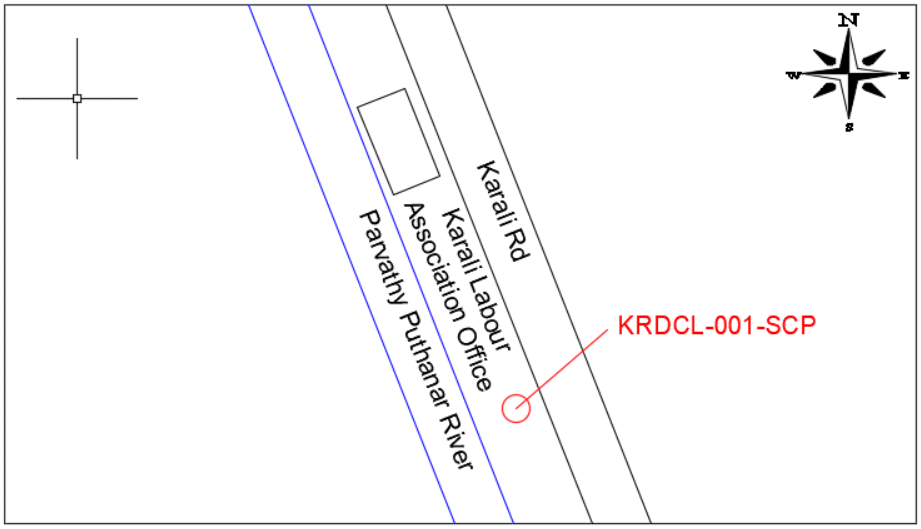
CLIENT	CONSULTANT	SURVEYED BY	DATE : 27.09.2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-001-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
8° 28' 53.77693" N	76° 55' 46.68898" E	-93.884	712425.956	938068.370	3.369

DESCRIPTION	The survey station, KRDCL-001-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Karali road. The survey station is near by shibu agencies,korali. It is approximately 2 metres away from the Parvathi Puthan river.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	 Latitude: 8.48163 Longitude: 76.9296555 Elevation: 1.65m Accuracy: 3.2m Time: 09-27-2019 12:25 Note: KRDCL-001-SCP



DGPS SURVEY REPORT

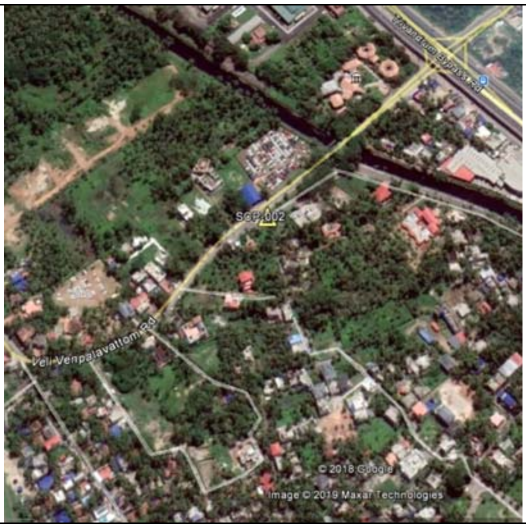
CLIENT	CONSULTANT	SURVEYED BY	DATE : 05.09.2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-002-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

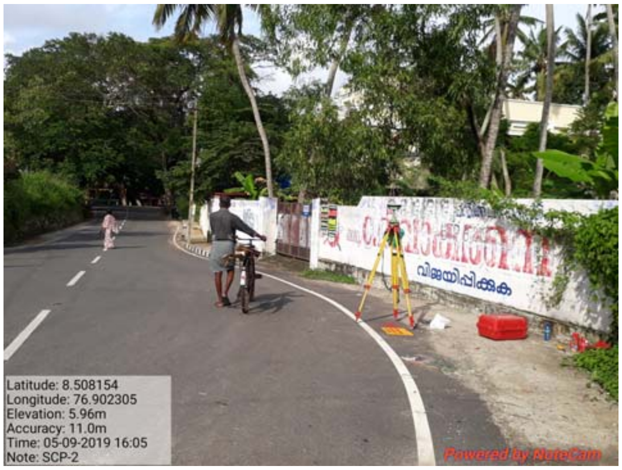
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
8° 30' 29.51542" N	76° 54' 08.53035" E	-93.725	709408.815	940995.198	3.535

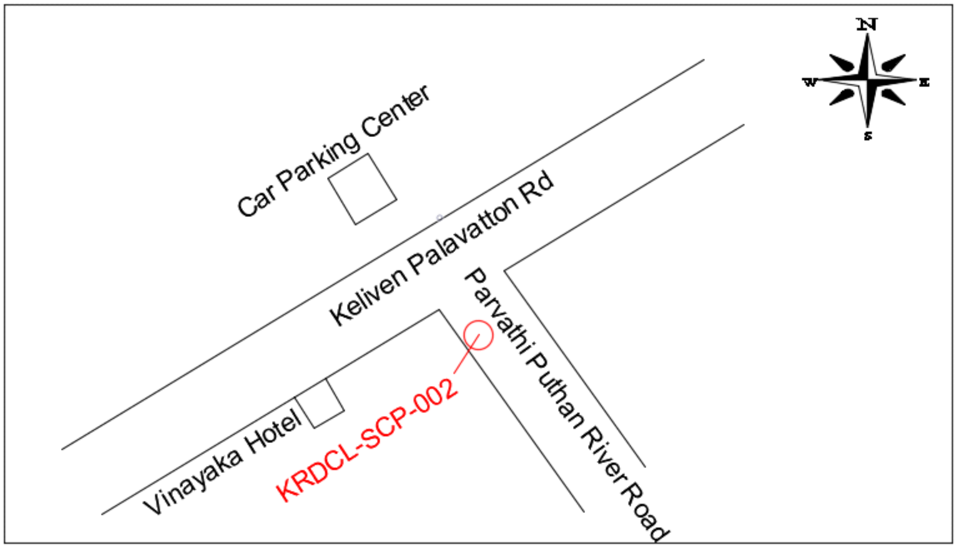
DESCRIPTION	The survey station, KRDCL-002-SCP is marked with red and white paint and nail point on the top of the Parvathi Puthan River BT road. The survey station is near by parvathi puthan river. It is approximately 10 metres away from the electric pole.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





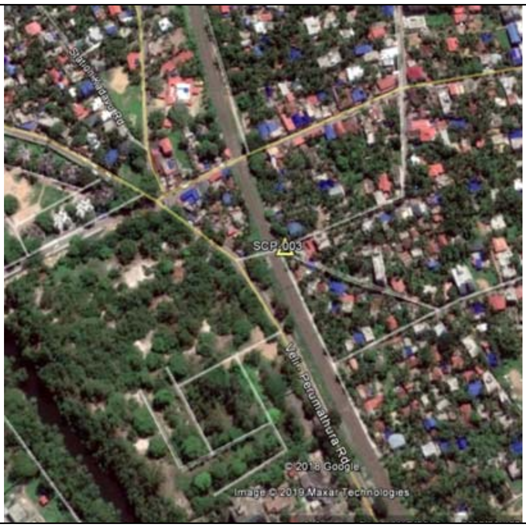
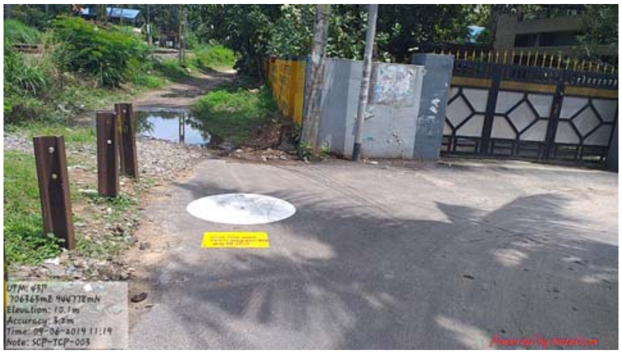
DGPS SURVEY REPORT

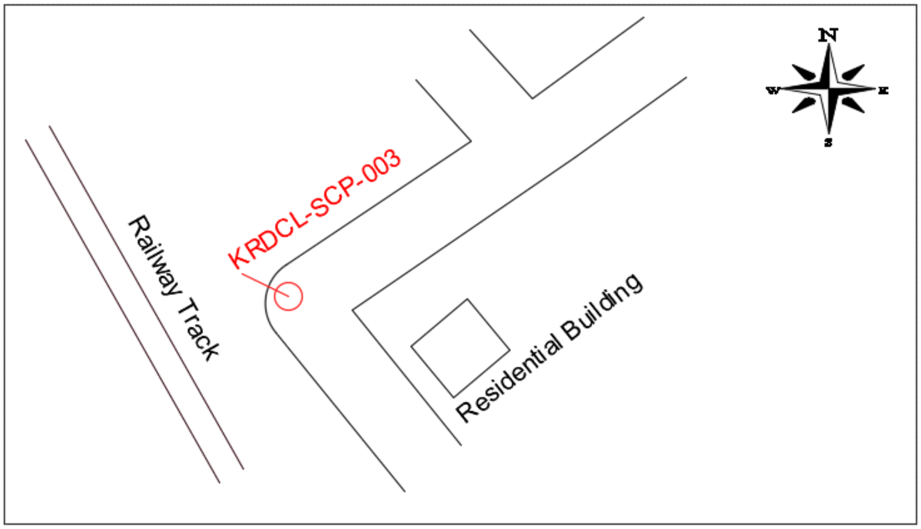
CLIENT	CONSULTANT	SURVEYED BY	DATE : 05.09.2019
			DGPS POINT ID
			KRDCL-003-SCP/TCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
8° 32' 33.19709" N	76° 52' 29.56120" E	-91.241	706363.127	944780.598	6.023

DESCRIPTION	The survey station, KRDCL-003-SCP/TCP is marked with white circular paint and nail point on the top of the corner of the BT road. The survey station is near by residential building,thumba. It is approximately 5 metres away from the railway track.

LOCATION ON GOOGLE MAP	**FIELD PHOTOGRAPH**
 SCP-003 Veli - Perumathura Rd © 2018 Google Image © 2019 Maxar Technologies	 UTM: 43P 706363mE 944778mN Elevation: 10.1m Accuracy: 3.2m Time: 09-06-2019 11:19 Note: SCP-TCP-003



DGPS SURVEY REPORT

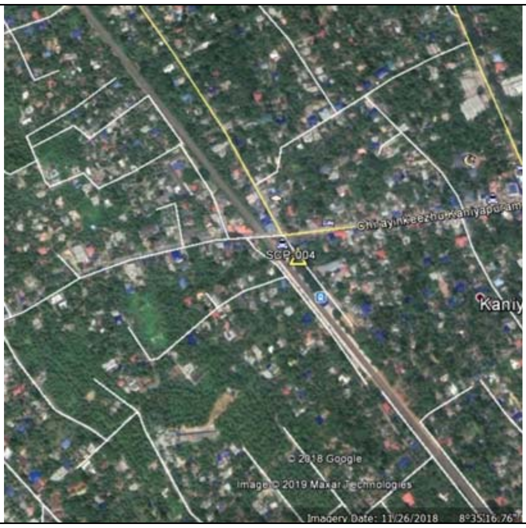
CLIENT	CONSULTANT	SURVEYED BY	DATE : 05.09.2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-004-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

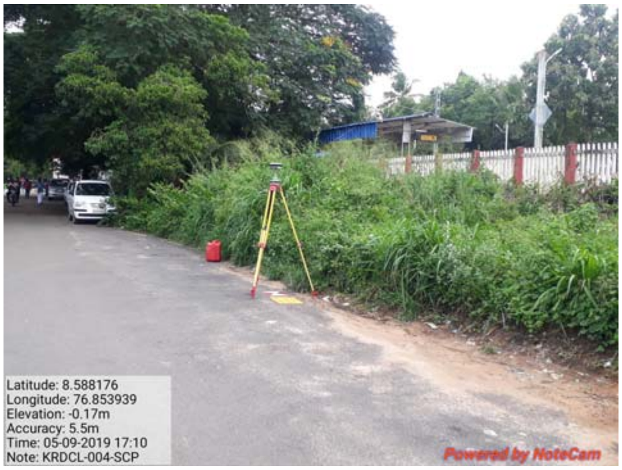
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
8° 35' 17.11208" N	76° 51' 14.15884" E	-87.178	704032.694	949805.752	10.125

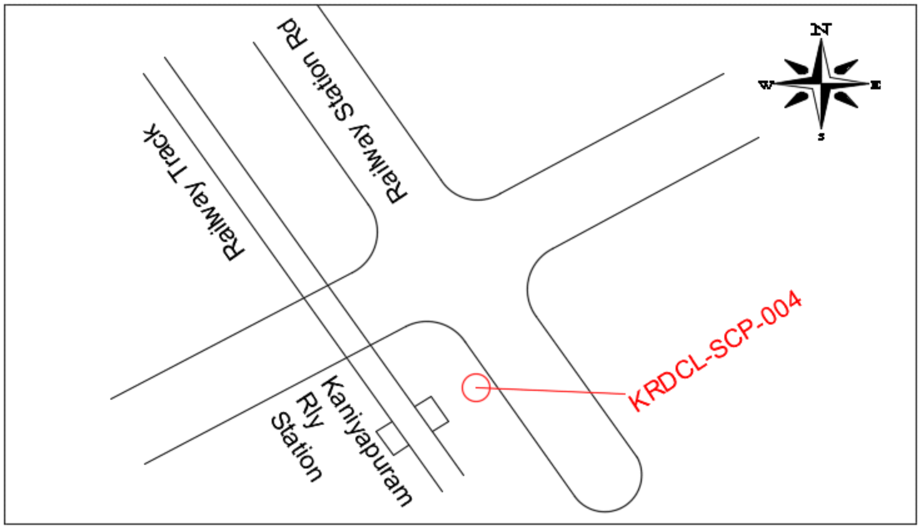
DESCRIPTION	The survey station, KRDCL-004-SCP is marked with red and white paint and nail point on the top of the Kanniyapuram railway staion BT road. The survey station is near by raiway station,kaniyapuram. It is approximately 5 metres away from the railway track.

LOCATION ON GOOGLE MAP


Chirayinkeezhu-Kaniyapuram
SCP-004
Kaniy
© 2018 Google
Image © 2019 Maxar Technologies
Imagery Date: 11/26/2018 8°35'16.76"

FIELD PHOTOGRAPH





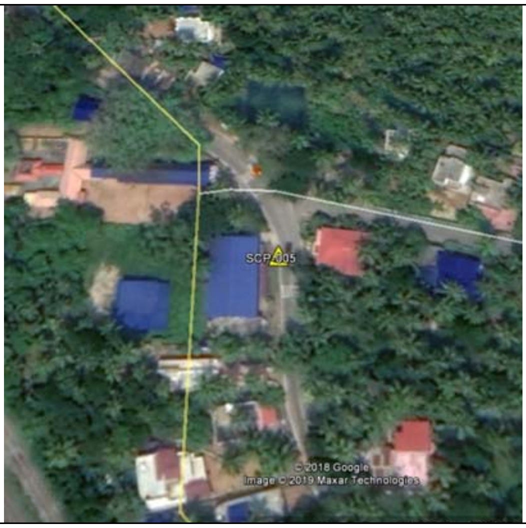
DGPS SURVEY REPORT

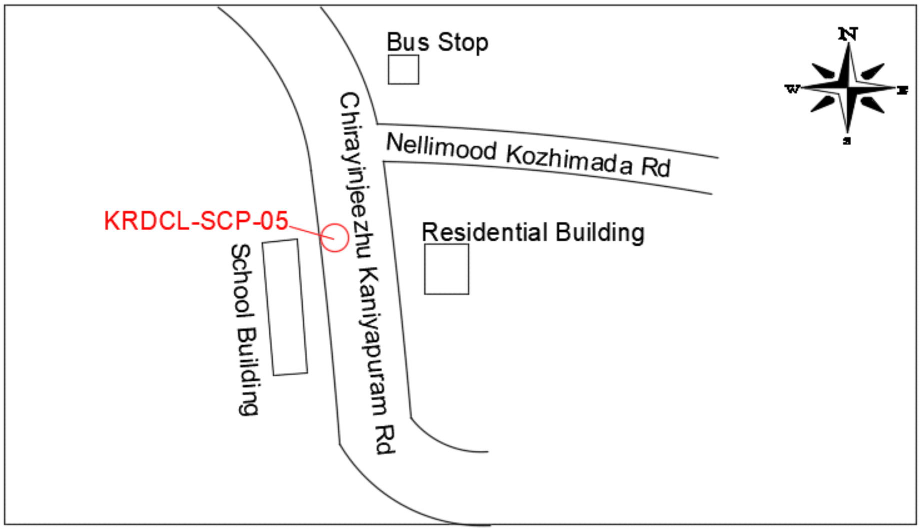
CLIENT	CONSULTANT	SURVEYED BY	DATE : 27.09.2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-005-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
8° 37' 06.84171" N	76° 49' 37.80450" E	-90.283	701070.033	953163.024	7.007

DESCRIPTION	The survey station, KRDCL-005-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Chiriyankeezhu-Kanniyapuram road. The survey station is near by junction, nellmood koyhinada road. It is approximately 70 metres away from the railway track.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	



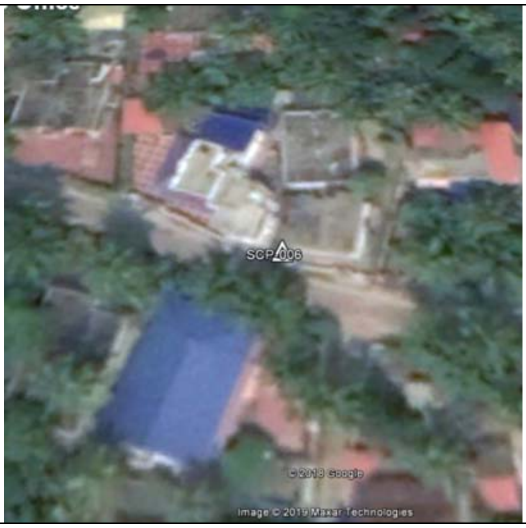
DGPS SURVEY REPORT

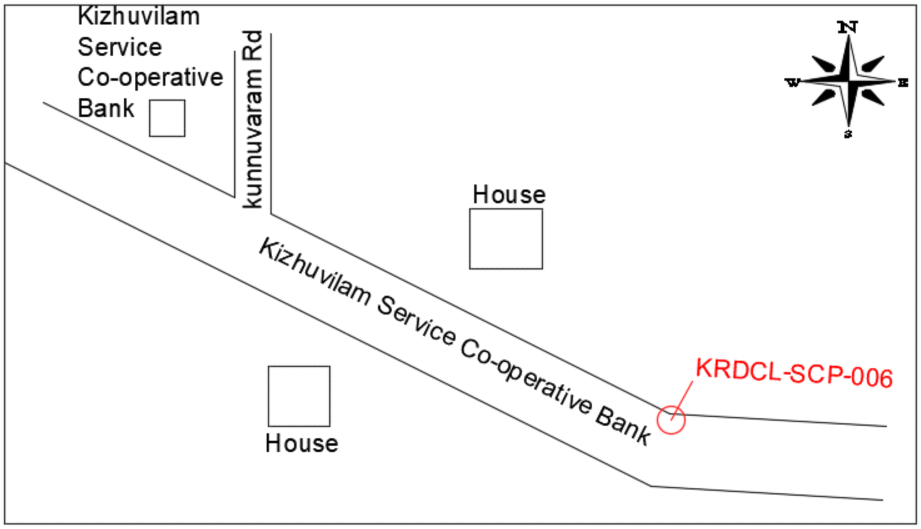
CLIENT	CONSULTANT	SURVEYED BY	DATE : 05.09.2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-006-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
8° 39' 45.71540" N	76° 48' 15.29792" E	-84.832	698524.067	958032.336	12.414

DESCRIPTION	The survey station, KRDCL-006-SCP is marked with red and white paint and nail point on the top of the Kizhuvilam Service Co-Operative bank road BT road. The survey station is near by kattumarakkal jumma masjid. It is approximately 70 metres away from the bhahmapuri temple.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	



Kizhuvilam Service Co-operative Bank
Kunnuvaram Rd
N
W
E
S
House
Kizhuvilam Service Co-operative Bank
KRDCL-SCP-006
House

DGPS SURVEY REPORT

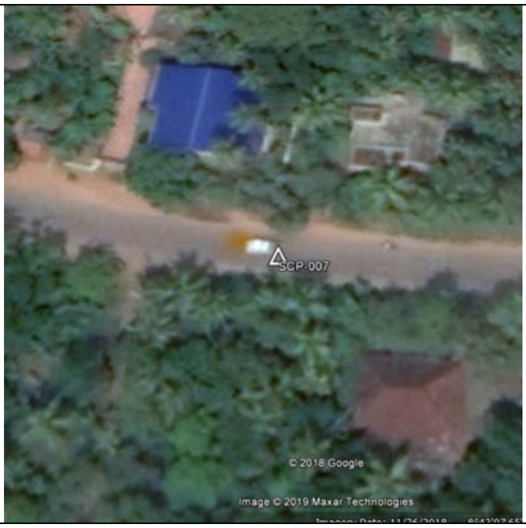
CLIENT	CONSULTANT	SURVEYED BY	DATE : 06.09.2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-007-SCP/TCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

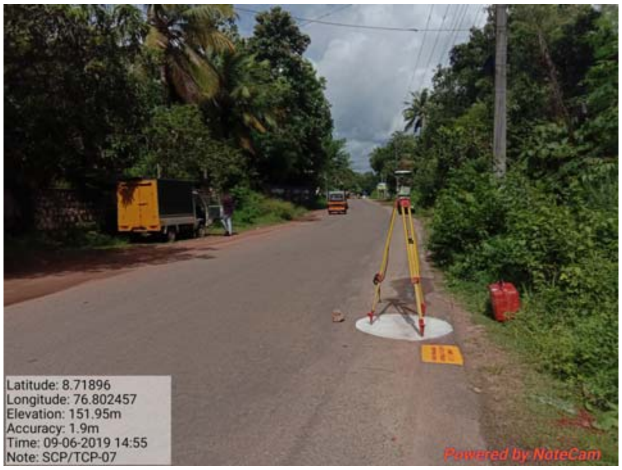
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
8° 43' 08.21953" N	76° 48' 08.99306" E	-61.275	698301.716	964253.248	36.087

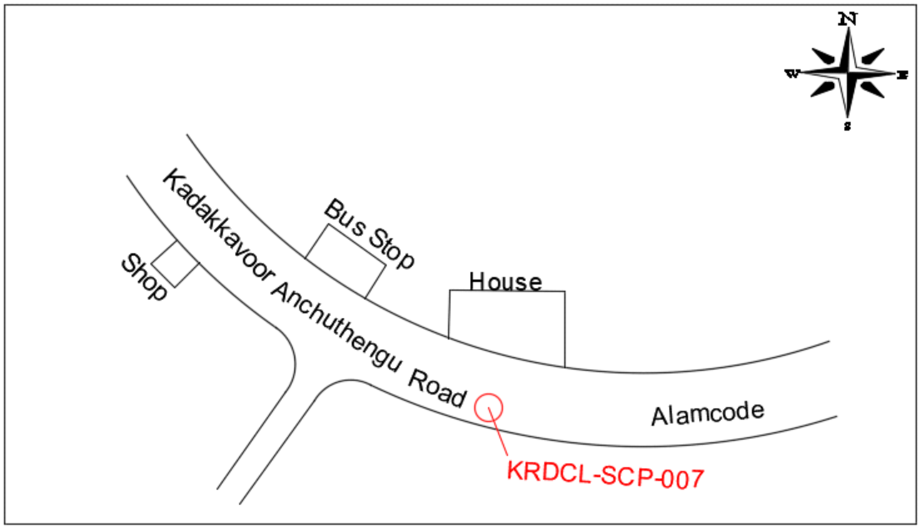
DESCRIPTION	The survey station, KRDCL-007-SCP/TCP is marked with white circular paint and nail point on the top of the Alamcode-kadakkavoor-Anchutengu BT road. The survey station is near by bus stop,kadakkvoor. It is approximately 2 metres away from the electric pole.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





DGPS SURVEY REPORT

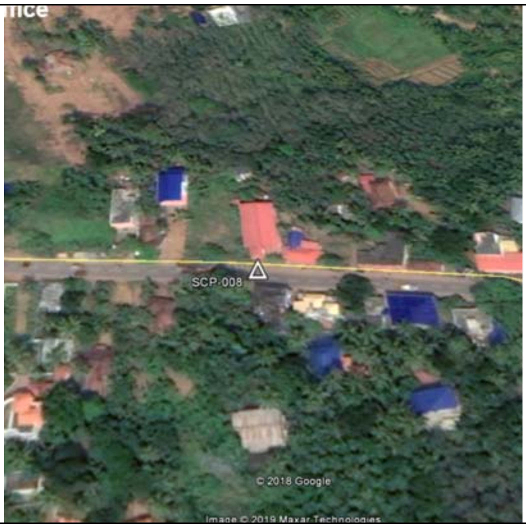
CLIENT	CONSULTANT	SURVEYED BY	DATE : 06.09.2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-008-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

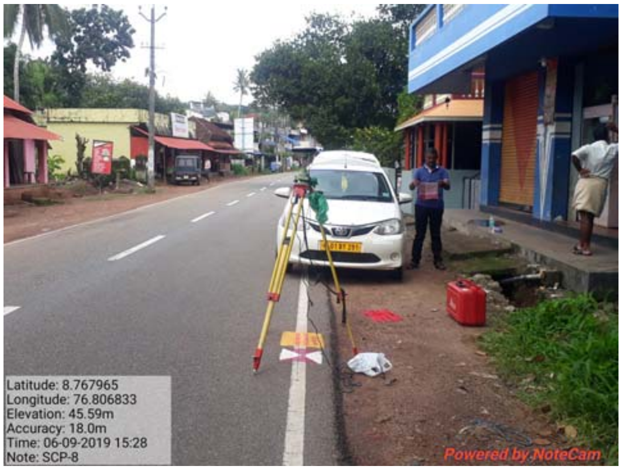
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
8° 46' 04.60906" N	76° 48' 24.74163" E	-43.629	698757.153	969675.042	53.540

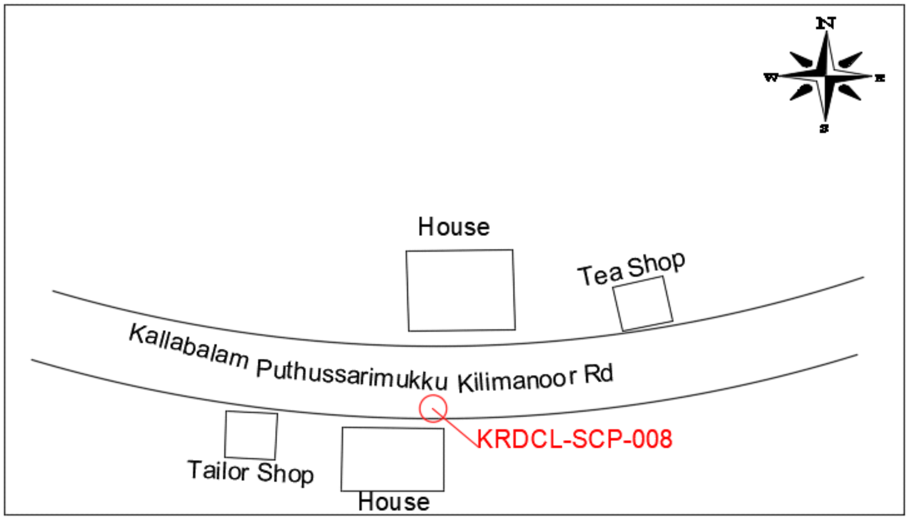
DESCRIPTION	The survey station, KRDCL-008-SCP is marked with red and white paint and nail point on the top of the Kallabalam-Puthusarimukku-Killimanoor BT road. The survey station is near by tailor shop,puthuserinkku. It is approximately 20 metres away from the electric pole.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





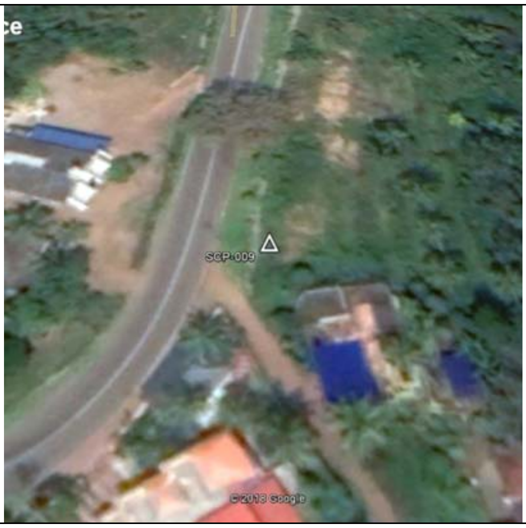
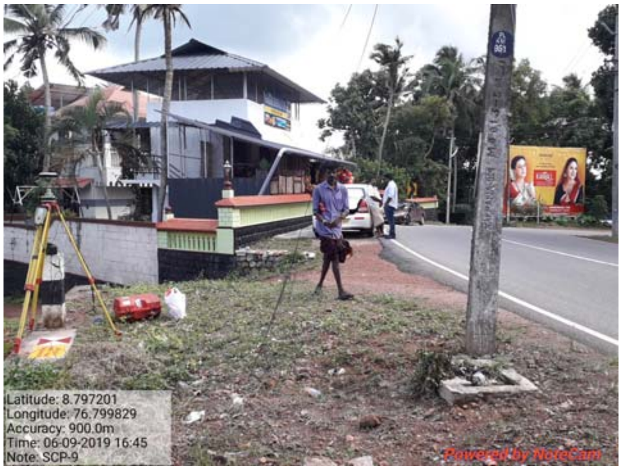
DGPS SURVEY REPORT

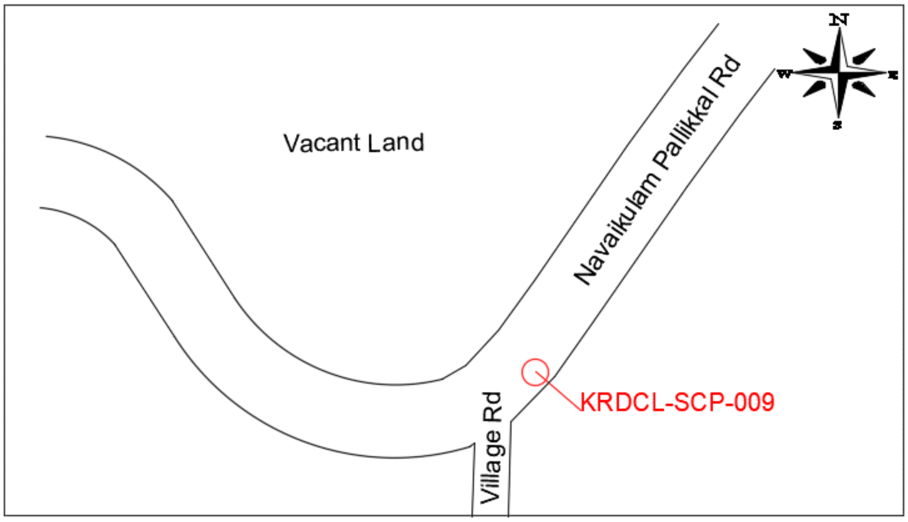
CLIENT	CONSULTANT	SURVEYED BY	DATE : 06.09.2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-009-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
8° 47' 38.88716" N	76° 47' 59.40061" E	-4.101	697968.699	972567.975	93.020

DESCRIPTION	The survey station, KRDCL-009-SCP is marked with red and white paint and nail point on the top of the culvert on the side of the Navikkal-Pallikal BT road. The survey station is near by csi church,maruthi kunnu. It is approximately 2 metres away from the electric pole.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	 Latitude: 8.797201 Longitude: 76.799829 Accuracy: 900.0m Time: 06-09-2019 16:45 Note: SCP-9 Powered by NoteCam



DGPS SURVEY REPORT

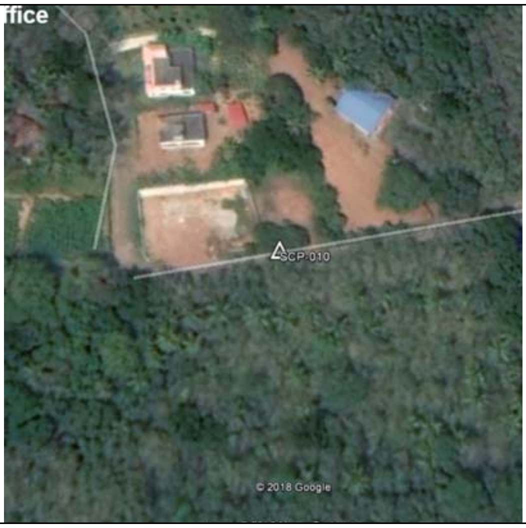
CLIENT KRDCL	CONSULTANT SYSTRA	SURVEYED BY GEO KNO	DATE : 27.09.2019 DGPS POINT ID KRDCL-010-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

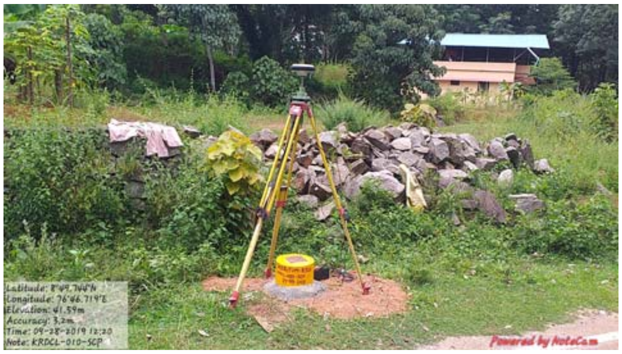
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
8° 49' 44.85657" N	76° 46' 43.06396" E	-53.539	695617.209	976427.145	43.584

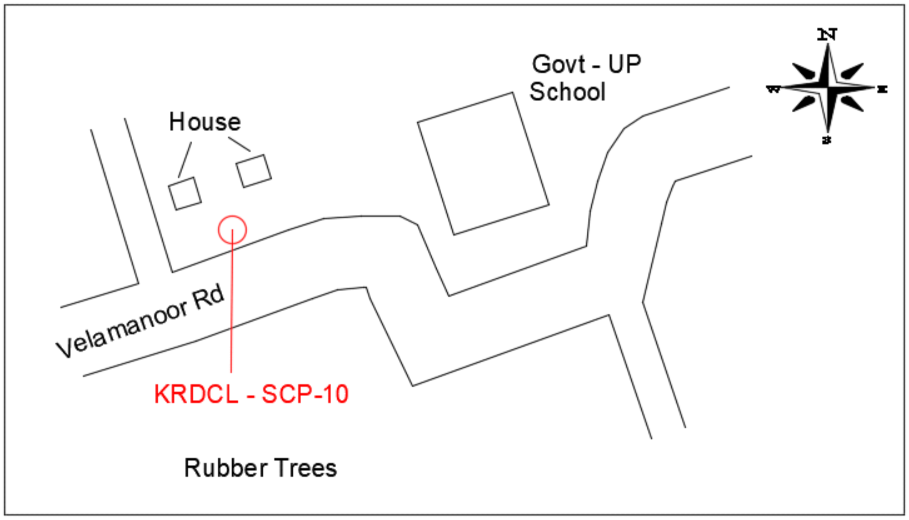
DESCRIPTION	The survey station, KRDCL-010-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Paripally-Valamanoor Road. The survey station is near by residential building,valamanoor. It is approximately 70 metres away from the government school.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





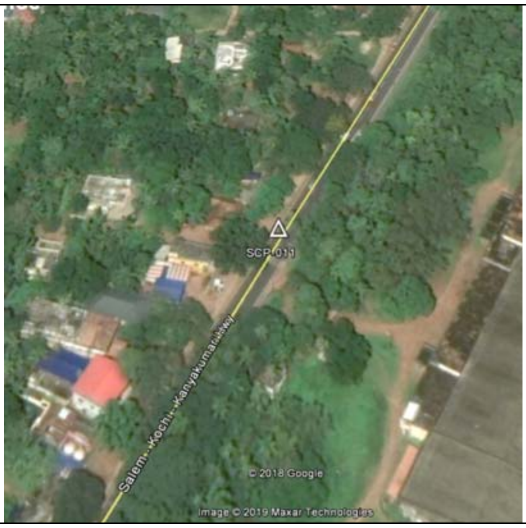
DGPS SURVEY REPORT

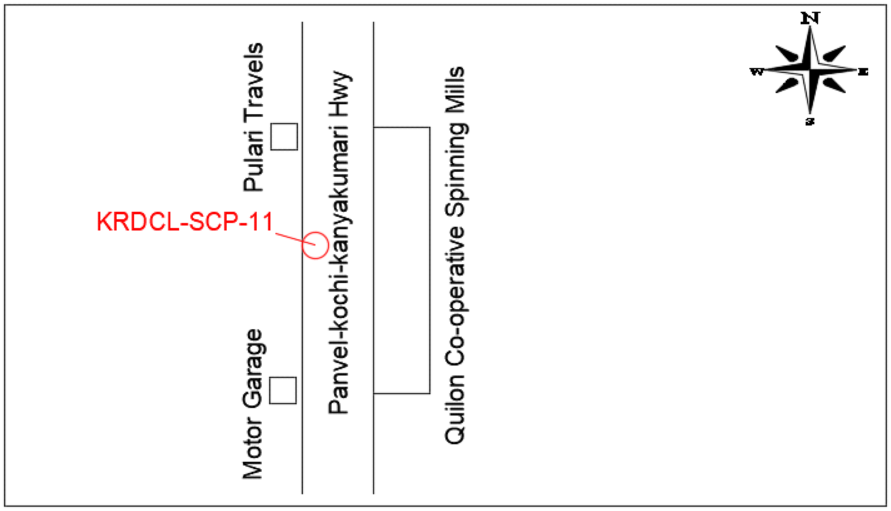
CLIENT	CONSULTANT	SURVEYED BY	DATE : 06.09.2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-011-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
8° 50' 48.19931" N	76° 44' 03.25990" E	-44.851	690724.603	978350.275	52.211

DESCRIPTION	The survey station, KRDCL-011-SCP is marked with red and white paint and nail point on the top of the Panavel-Kochi-Kanniyakumari Highway BT road. The survey station is near by quilon cooperative spinning mills,karamcode. It is approximately 50 metres away from the pulari travels.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
 SCP-011 Salem - Kochi - Kanyakumari Hwy © 2018 Google Image © 2019 Maxar Technologies	Latitude: 8.84663 Longitude: 76.734313 Elevation: 148.14m Accuracy: 2.5m Time: 09-06-2019 18:26 Note: SCP-011 Powered by NoteCam



N
W
E
S
Pulari Travels
KRDCL-SCP-11
Motor Garage
Panvel-kochi-kanyakumari Hwy
Quilon Co-operative Spinning Mills

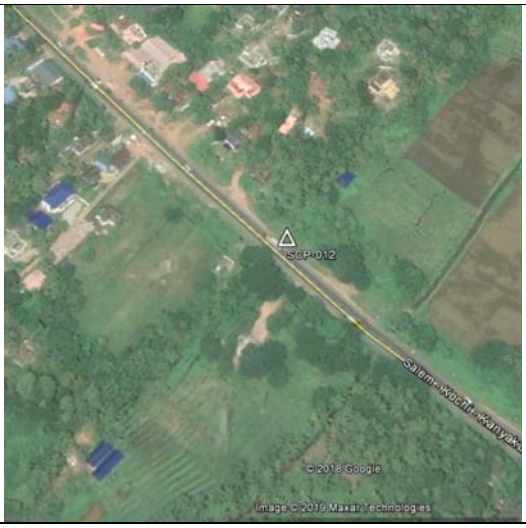
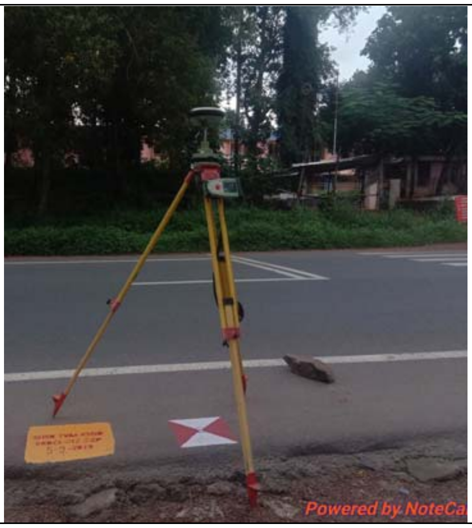
DGPS SURVEY REPORT

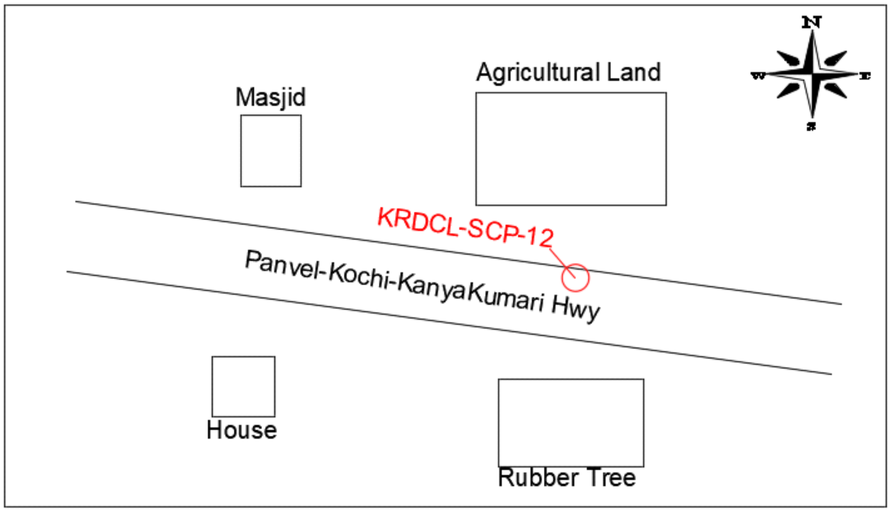
CLIENT	CONSULTANT	SURVEYED BY	DATE : 07.09.2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID
			KRDCL-012-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
8° 51' 50.94586" N	76° 41' 12.15311" E	-90.488	685487.274	980254.015	6.447

DESCRIPTION	The survey station, KRDCL-012-SCP is marked with red and white paint and nail point on the top of the Panavel-Kochi-Kanniyakumari Highway BT road. The survey station is near by National highway 66. It is approximately 100 metres away from the masjid.

LOCATION ON GOOGLE MAP	**FIELD PHOTOGRAPH**
 SCP-012 Salem-Kochi-Kanyakumari © 2018 Google Image © 2019 Maxar Technologies	



DGPS SURVEY REPORT

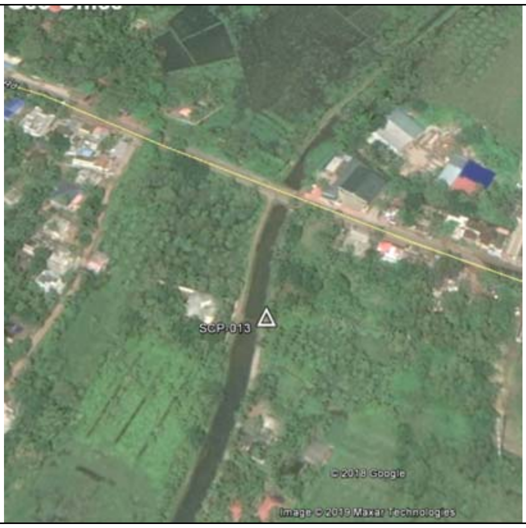
CLIENT	CONSULTANT	SURVEYED BY	
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DATE : 07.09.2019 DGPS POINT ID KRDCL-013-SCP/TCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

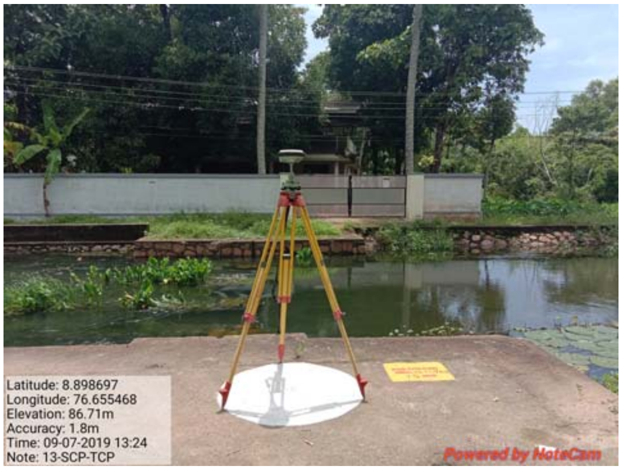
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
8° 53' 54.97620" N	76° 39' 19.50968" E	-92.246	682028.403	984049.057	4.536

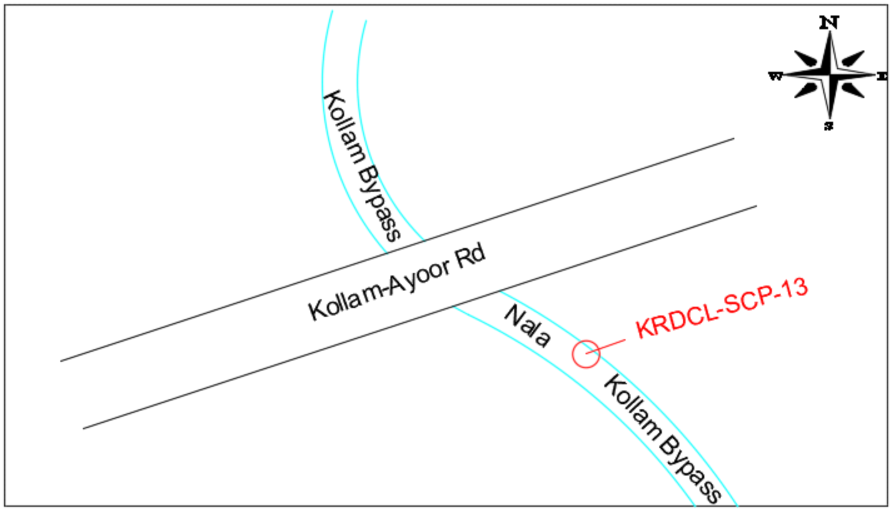
DESCRIPTION	The survey station, KRDCL-013-SCP/TCP is marked with white circular paint and nail point on the top of the concrete slab on the side of the kollam bypass river. The survey station is near by kollam nalla,mukhathala. It is approximately 20 metres away from the residential building.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





DGPS SURVEY REPORT

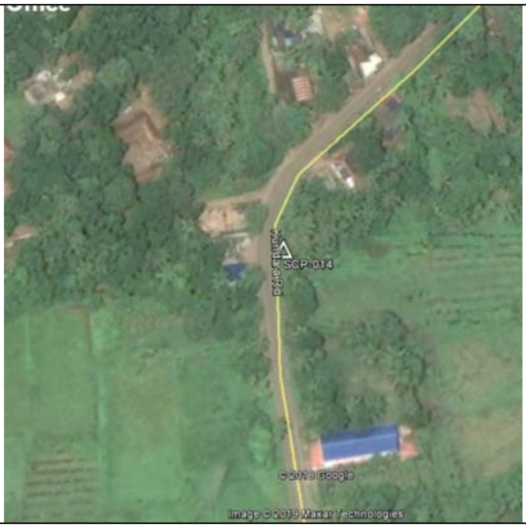
CLIENT	CONSULTANT	SURVEYED BY	DATE : 07.09.2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-014-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

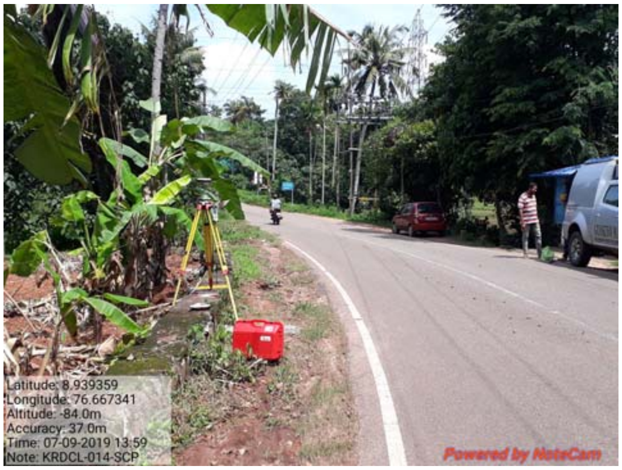
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
8° 56' 22.12595" N	76° 40' 02.50487" E	-81.156	683321.608	988575.783	15.586

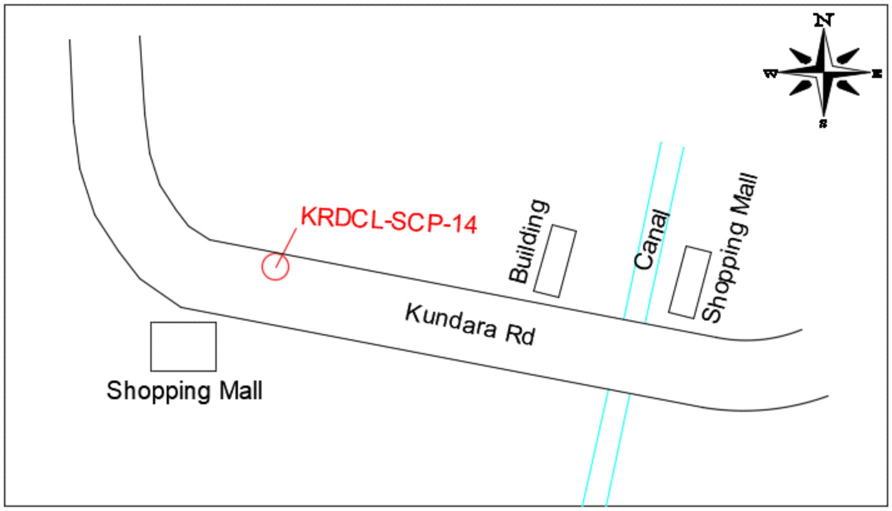
DESCRIPTION	The survey station, KRDCL-014-SCP is marked with red and white paint and nail point on the top of the retaining wall on the side of the Kundara road. The survey station is near by residential building,keralapuram. It is approximately 20 metres away from the electric pole.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





DGPS SURVEY REPORT

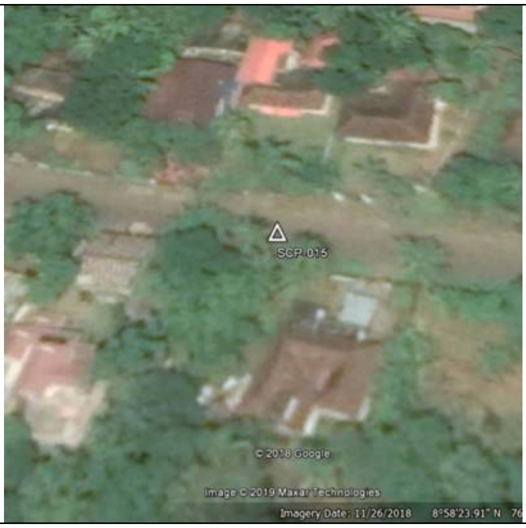
CLIENT KRDCL	CONSULTANT SYSTRA	SURVEYED BY GEO KNO	DATE : 28-09-2019 DGPS POINT ID KRDCL-015-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

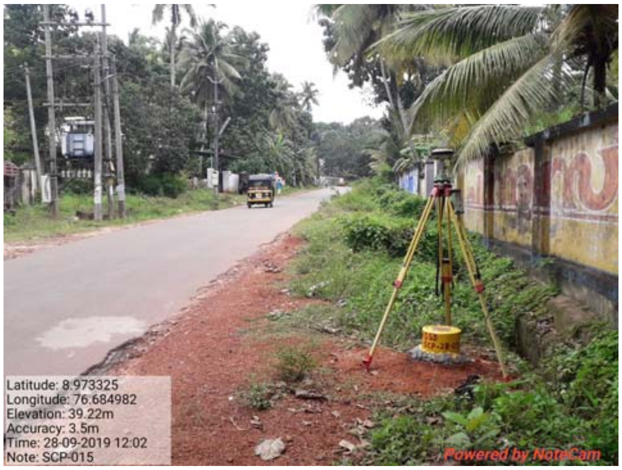
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
8° 58' 23.91391" N	76° 41' 06.05759" E	-58.991	685245.959	992326.302	37.757

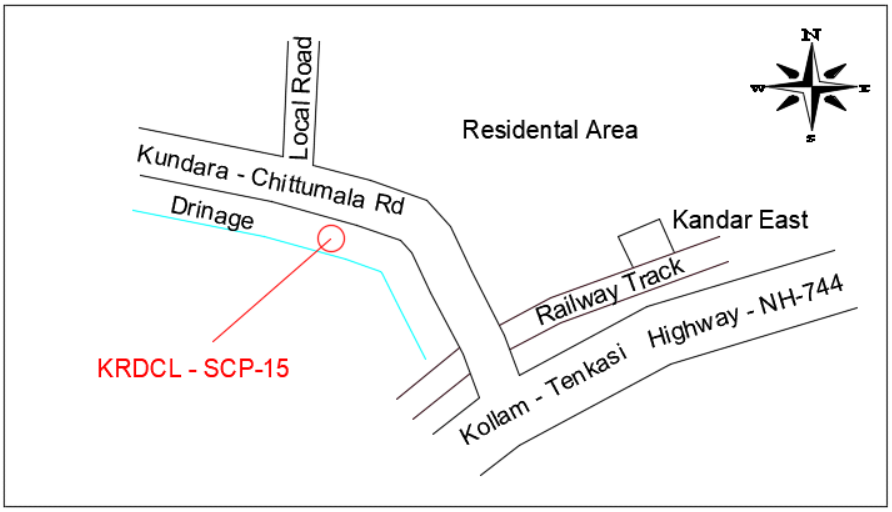
DESCRIPTION	The survey station, KRDCL-015-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Kanadara-Chittumala Road. The survey station is near by kannimel bus stop. It is approximately 10 metres away from the electric pole.

LOCATION ON GOOGLE MAP


SCP-015
© 2018 Google
Image © 2019 Maxar Technologies
Imagery Date: 11/26/2018 8°58'23.91" N 76

FIELD PHOTOGRAPH





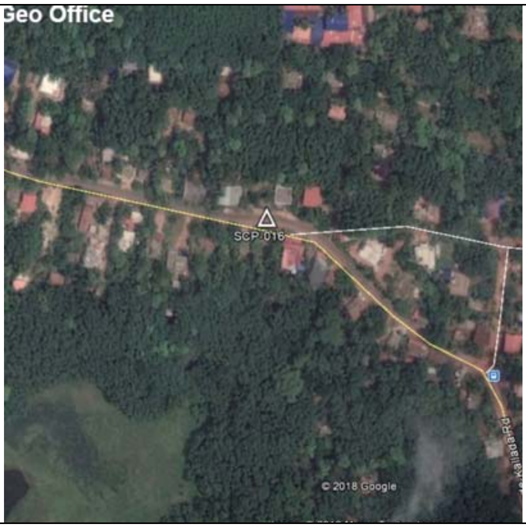
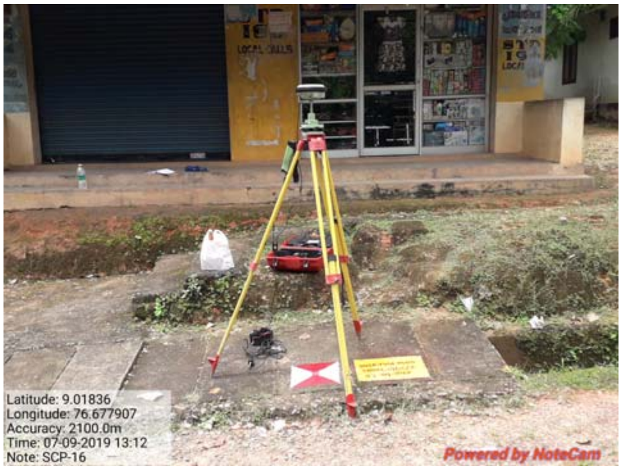
DGPS SURVEY REPORT

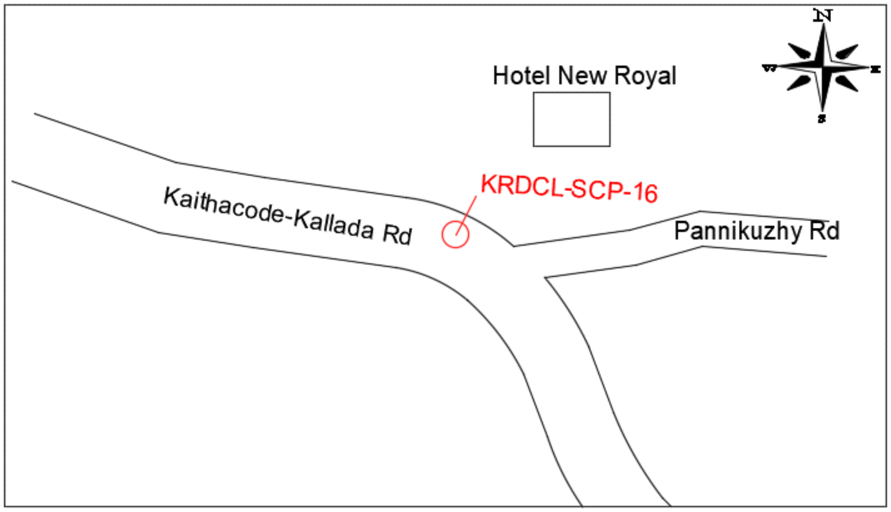
CLIENT	CONSULTANT	SURVEYED BY	DATE : 07.09.2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-016-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 01' 13.18394" N	76° 40' 44.78273" E	-68.157	684572.246	997523.803	28.502

DESCRIPTION	The survey station, KRDCL-016-SCP is marked with red and white paint and nail point on the top of the concrete slab covering a Drinage on the side of the Kaithakode-Kallada BT road. The survey station is near by royal enterprises,othiramukah. It is approximately 5 metres away from the fancy store.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	



DGPS SURVEY REPORT

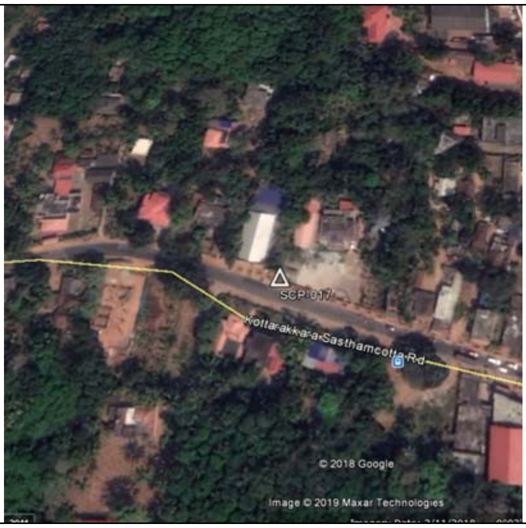
CLIENT	CONSULTANT	SURVEYED BY	DATE : 07.09.2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-017-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

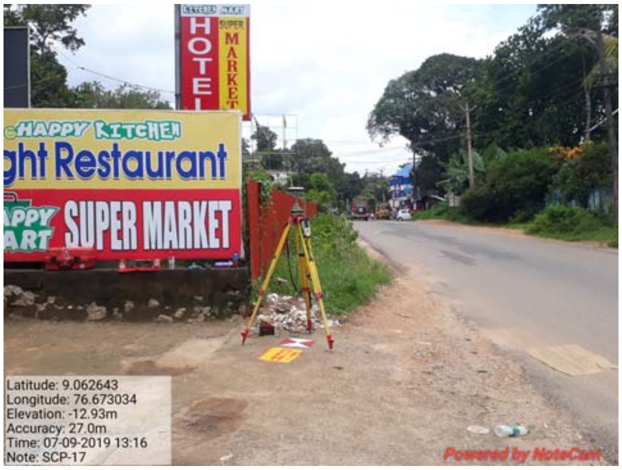
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 03' 44.93115" N	76° 40' 23.10328" E	-62.708	683888.702	1002182.885	33.862

DESCRIPTION	The survey station, KRDCL-017-SCP is marked with red and white paint and nail point on the top of the Kotteakara-Sasthamcotta BT road. The survey station is near by happy mart super market,kunnathur. It is approximately 10 metres away from the electric pole.

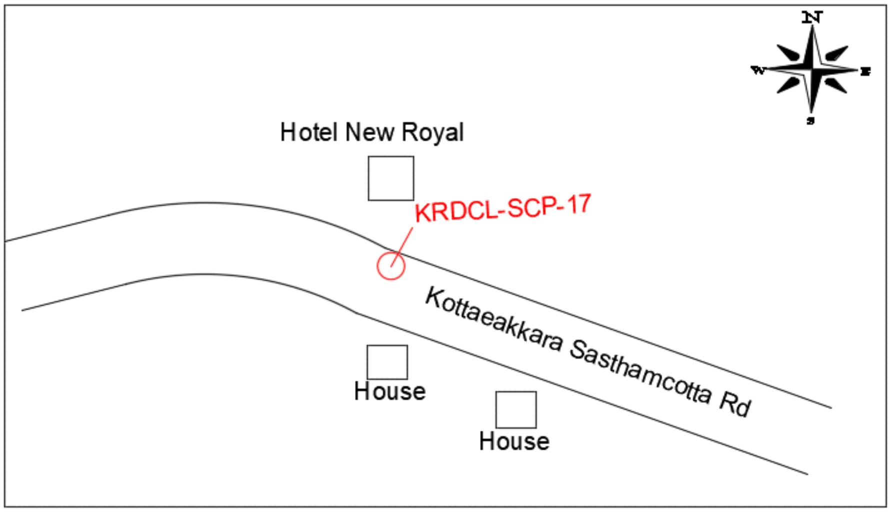
LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH



Latitude: 9.062643
Longitude: 76.673034
Elevation: -12.93m
Accuracy: 27.0m
Time: 07-09-2019 13:16
Note: SCP-17



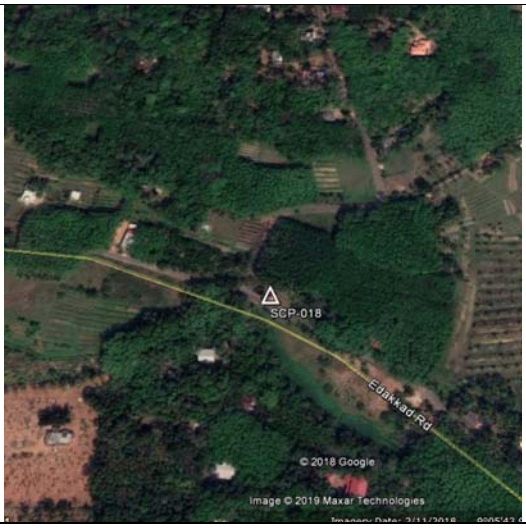
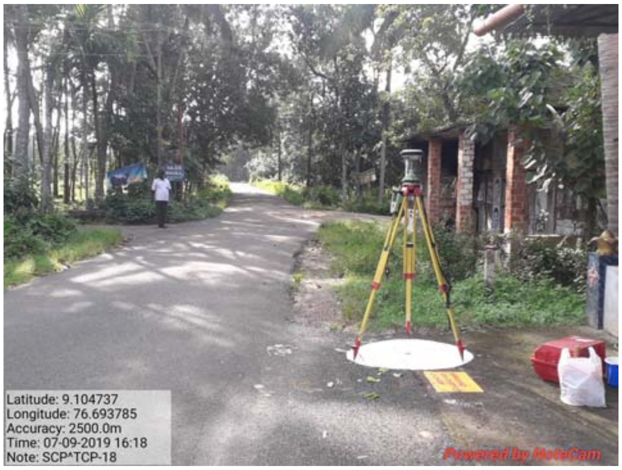
DGPS SURVEY REPORT

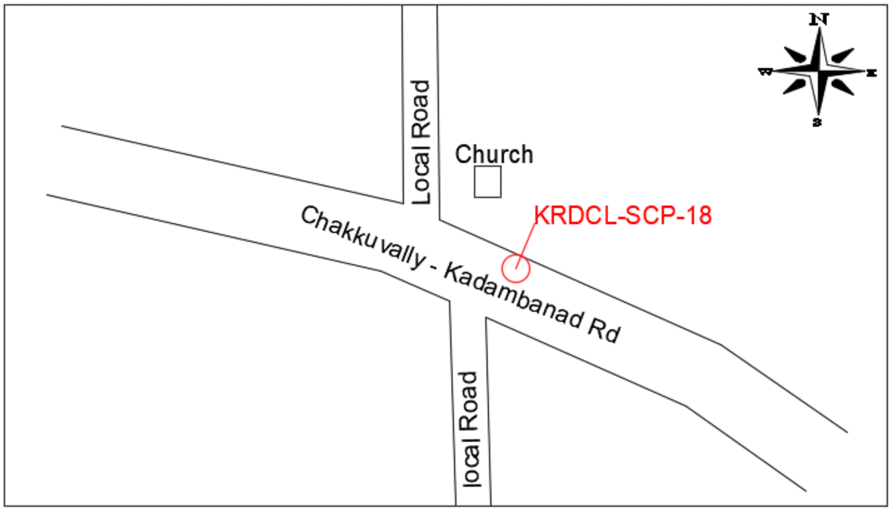
CLIENT	CONSULTANT	SURVEYED BY	DATE : 07.09.2019
KRDCL			DGPS POINT ID
			KRDCL-018-SCP/TCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 05' 39.63925" N	76° 40' 24.99028" E	-81.919	683930.082	1005707.328	14.605

DESCRIPTION	The survey station, KRDCL-018-SCP/TCP is marked with white circular paint and nail point on the top of the Chakkuvally-Kadambanad BT road. The survey station is near by Edakkadu. It is approximately 100 metres away from the church.

LOCATION ON GOOGLE MAP	**FIELD PHOTOGRAPH**
 SCP-018 Edakkad Rd © 2018 Google Image © 2019 Maxar Technologies	 Latitude: 9.104737 Longitude: 76.693785 Accuracy: 2500.0m Time: 07-09-2019 16:18 Note: SCP^TCP-18 Powered by NoteCam



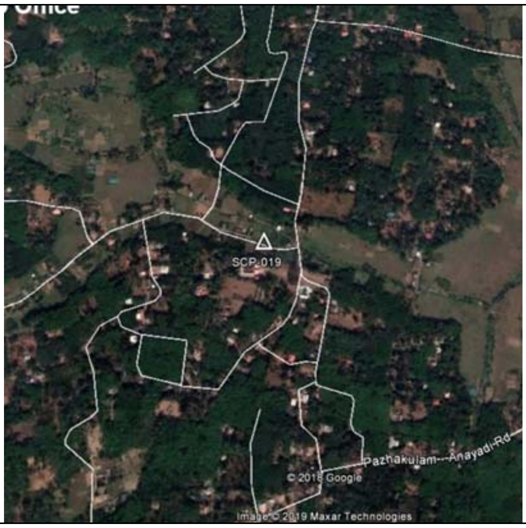
DGPS SURVEY REPORT

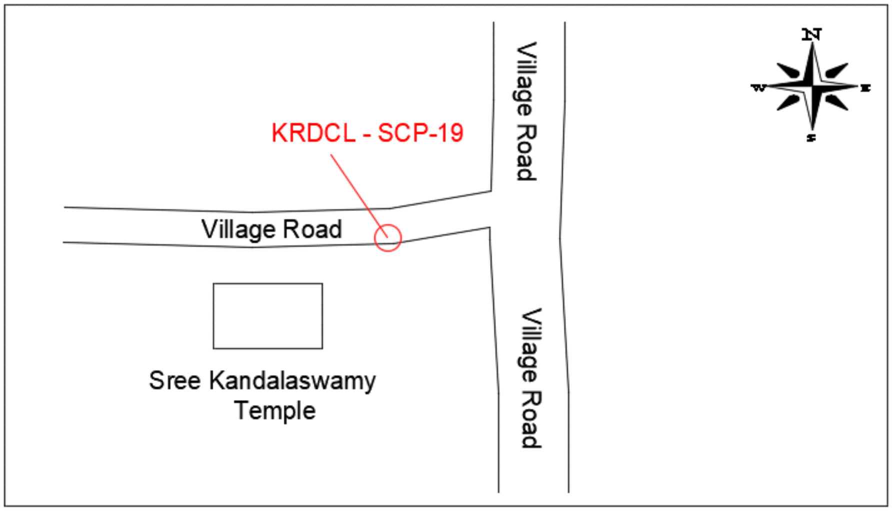
CLIENT	CONSULTANT	SURVEYED BY	DATE : 07.09.2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID
			KRDCL-019-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 08' 49.51584" N	76° 39' 01.69970" E	-82.823	681360.076	1011529.190	13.561

DESCRIPTION	The survey station, KRDCL-019-SCP is marked with red and white paint and nail point on the top of the village BT road. The survey station is near by sree kandalasway temple,noonanad. It is approximately 30 metres away from the electric pole.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
 Office SCP_019 Pazhakulam—Anayadi-Rd © 2018 Google Image © 2019 Maxar Technologies	Latitude: 9.147153 Longitude: 76.650353 Elevation: 100.61m Accuracy: 2.0m Time: 09-07-2019 18:47 Note: 19-SCP Powered by NoteCam



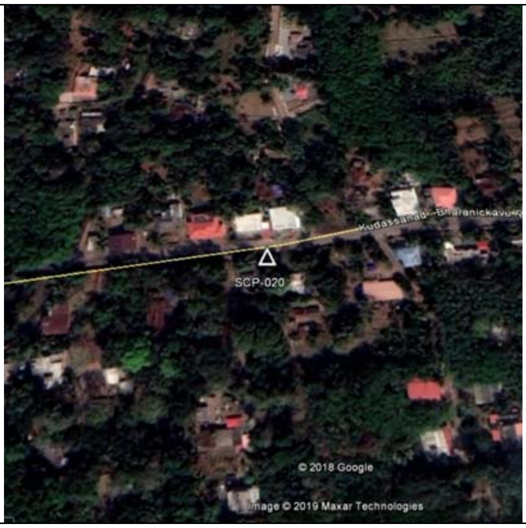
DGPS SURVEY REPORT

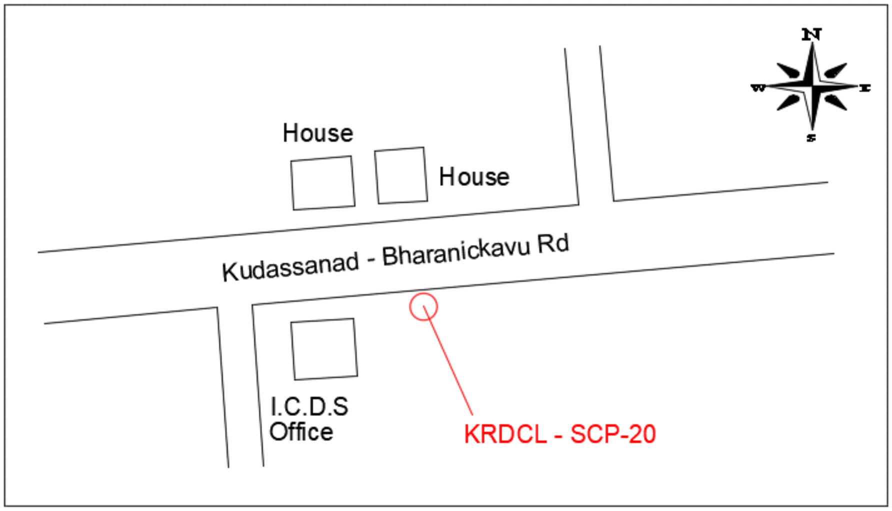
CLIENT	CONSULTANT	SURVEYED BY	DATE : 29-09-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-020-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 11' 35.24776" N	76° 38' 26.04447" E	-77.406	680248.236	1016615.943	18.917

DESCRIPTION	The survey station, KRDCL-020-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Kundasandd-Bharahickauu Road. The survey station is near by residential building,kidangayam. It is approximately 5 metres away from the icds office.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
 Kudassanad - Bharanickavu R SCP-020 © 2018 Google Image © 2019 Maxar Technologies	Latitude: 9.193225 Longitude: 76.640568 Elevation: 31.82m Accuracy: 9.0m Time: 28-09-2019 17:03 Note: KRDCL-020-SCP



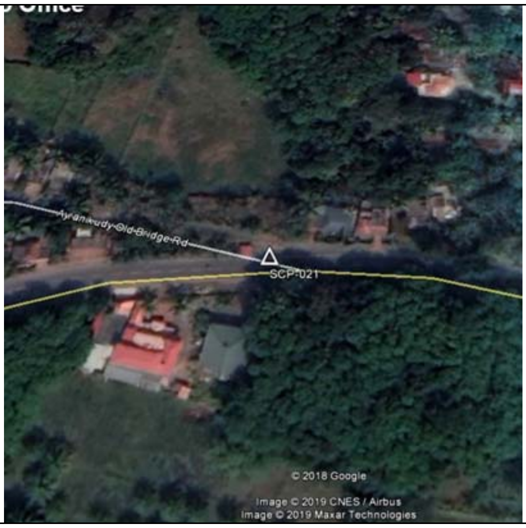
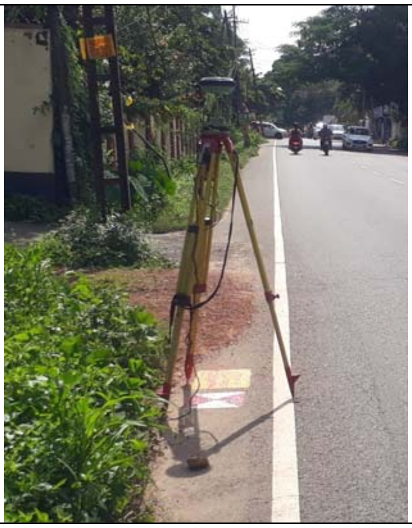
DGPS SURVEY REPORT

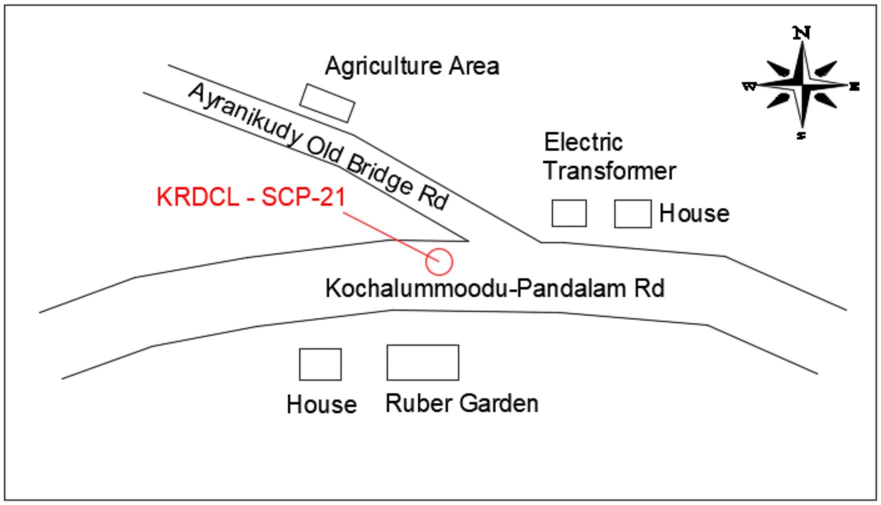
CLIENT	CONSULTANT	SURVEYED BY	DATE : 07.09.2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-021-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 13' 58.52087" N	76° 38' 39.49975" E	-87.485	680638.758	1021019.573	8.847

DESCRIPTION	The survey station, KRDCL-021-SCP is marked with red and white paint and nail point on the top of the Kochalammoodu-Pandalam BT road. The survey station is near by rubber garden,Ayranikudy village. It is approximately 10 metres away from the electric transformer.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
 Office Ayranikudy-Old-Bridge-Rd SCP-021 © 2018 Google Image © 2019 CNES / Airbus Image © 2019 Maxar Technologies	



DGPS SURVEY REPORT

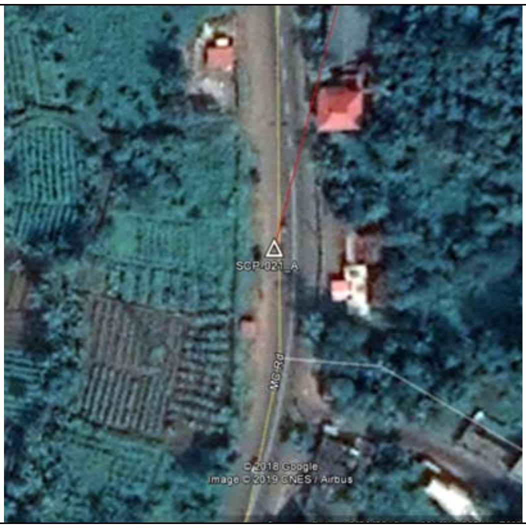
CLIENT	CONSULTANT	SURVEYED BY	DATE : 07.09.2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-021_A-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

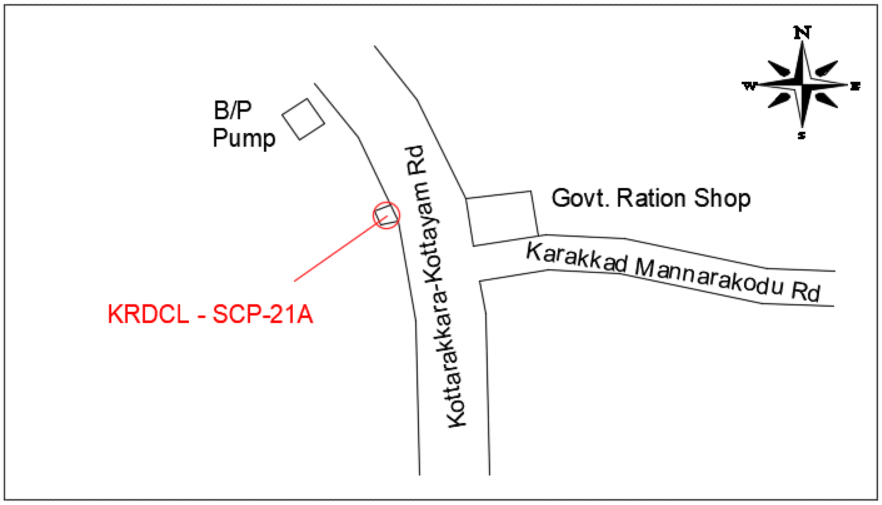
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 16' 40.42718" N	76° 39' 20.88033" E	-80.690	681878.731	1025999.661	15.685

DESCRIPTION	The survey station, KRDCL-021_A-SCP is marked with red and white paint and nail point on the top of the Kottarakara-Kottayam BT road. The survey station is near by bharath petrol station,kaaraikad. It is approximately 20 metres away from the ration shop.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH



DGPS SURVEY REPORT

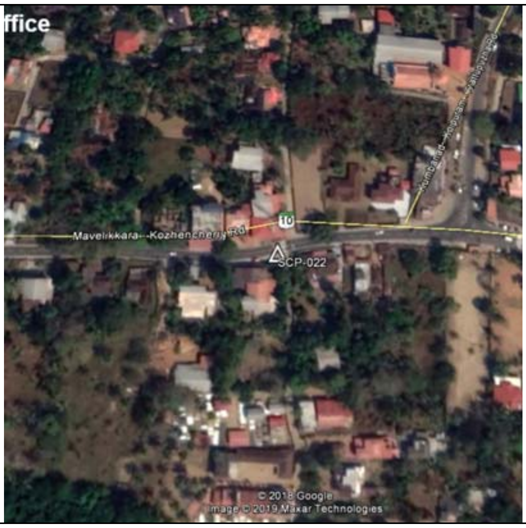
CLIENT	CONSULTANT	SURVEYED BY	DATE : 08.09.2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-022-SCP/TCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

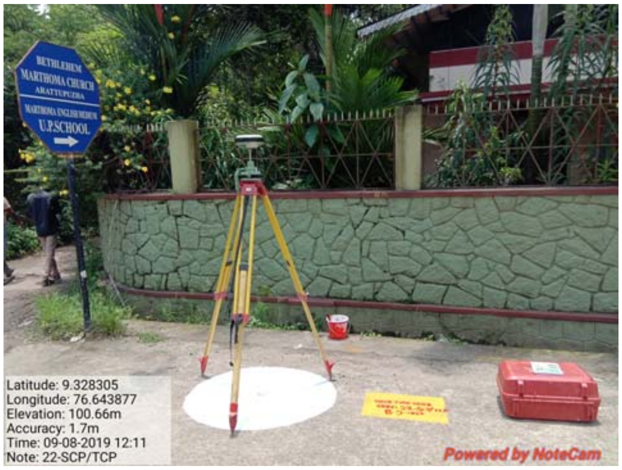
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 19' 41.88082" N	76° 38' 38.00969" E	-88.166	680544.452	1031568.369	8.137

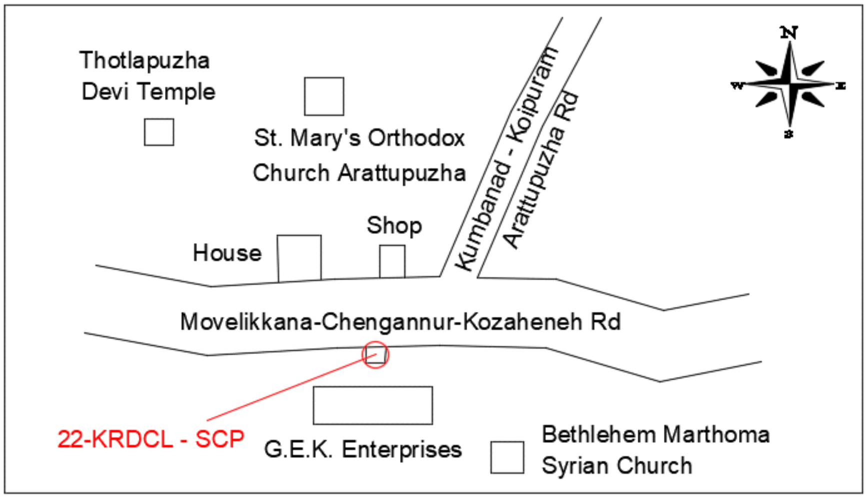
DESCRIPTION	The survey station, KRDCL-022-SCP/TCP is marked with white circular paint and nail point on the top of the Movelikkona-Kozhenchery BT road. The survey station is near by Gek enterprises,Arattupuzha. It is approximately 2 metres away from the name board.

LOCATION ON GOOGLE MAP


ffice
Mavelikkara - Kozhencherry Rd
10
SCP-022
© 2018 Google
Image © 2019 Maxar Technologies

FIELD PHOTOGRAPH





DGPS SURVEY REPORT

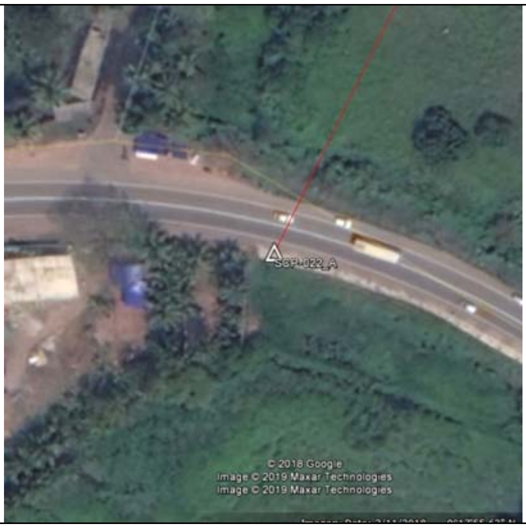
CLIENT	CONSULTANT	SURVEYED BY	DATE : 08.09.2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-022_A-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

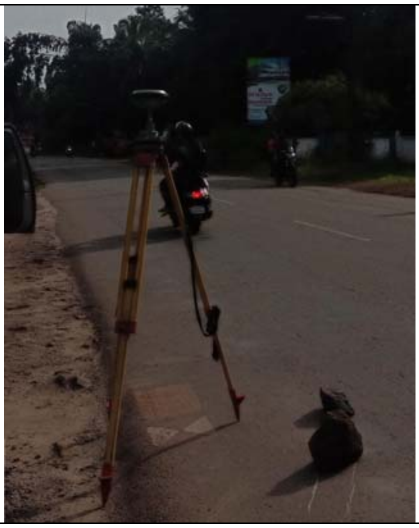
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 17' 55.74054" N	76° 38' 19.34402" E	-88.416	679989.956	1028304.791	7.933

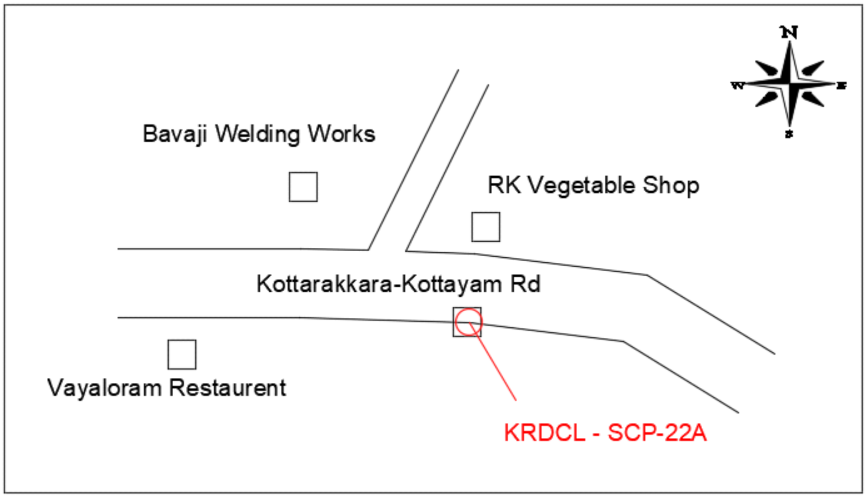
DESCRIPTION	The survey station, KRDCL-022_A-SCP is marked with red and white paint and nail point on the top of the Kottarakara-Kottayam BT road. The survey station is near by Vayaloram resturant,mulakuzha. It is approximately 30 metres away from the rk vegetable shop.

LOCATION ON GOOGLE MAP


SCP-022_A
© 2018 Google
Image © 2019 Maxar Technologies
Image © 2019 Maxar Technologies

FIELD PHOTOGRAPH





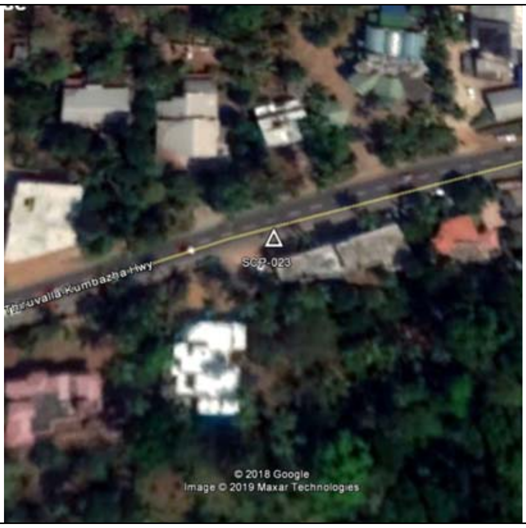
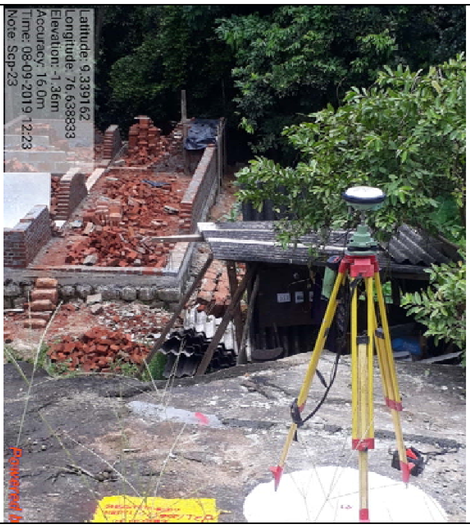
DGPS SURVEY REPORT

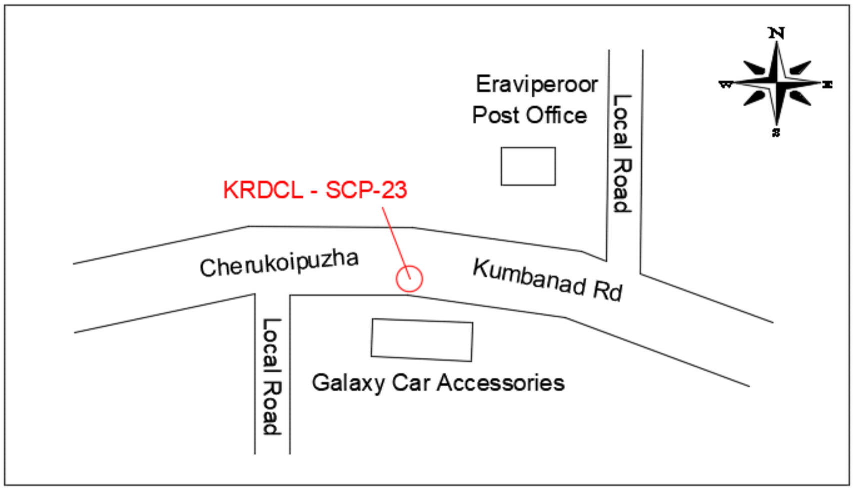
CLIENT KRDCL	CONSULTANT SYSTRA	SURVEYED BY GEO KNO	DATE : 08.09.2019 DGPS POINT ID KRDCL-023-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 22' 56.30062" N	76° 38' 09.22296" E	-89.758	679638.278	1037537.429	6.556

DESCRIPTION	The survey station, KRDCL-023-SCP is marked with red and white paint and nail point on the top of a Concrete slab on the side of the Cherukoipuzha-Kumbanad BT road. The survey station is near by Araman Bakery. It is approximately 50 metres away from the Eraviperoor post office.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	



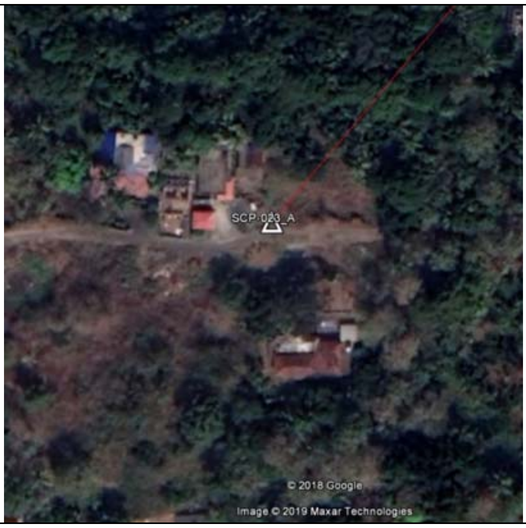
DGPS SURVEY REPORT

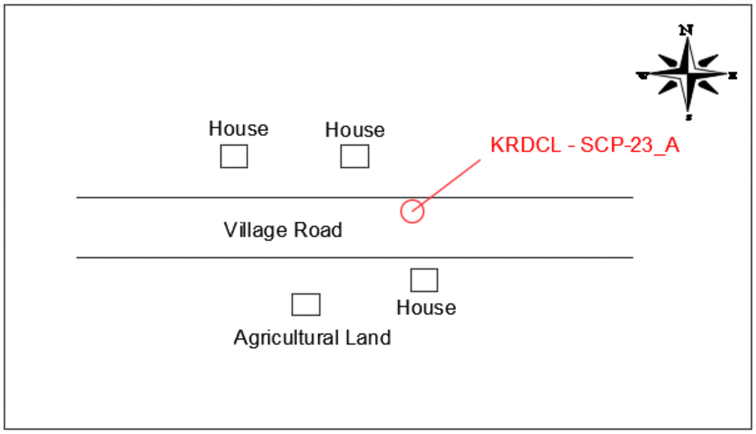
CLIENT	CONSULTANT	SURVEYED BY	DATE : 08.09.2019
			DGPS POINT ID
			KRDCL-023_A-SCP/TCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 20' 21.15666" N	76° 38' 19.70010" E	-85.534	679980.125	1032772.441	10.766

DESCRIPTION	The survey station, KRDCL-023_A-SCP/TCP is marked with white circular paint and nail point on the top of the road corner BT road. The survey station is near by agriculture land, Chengannur village. It is approximately 10 metres away from the residential building.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	



DGPS SURVEY REPORT

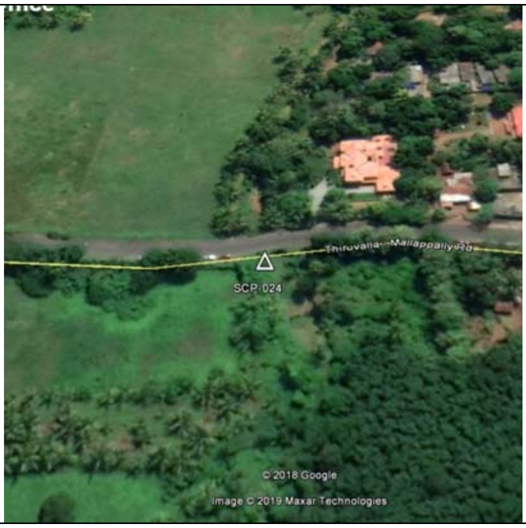
CLIENT	CONSULTANT	SURVEYED BY	DATE : 08.09.2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-024-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

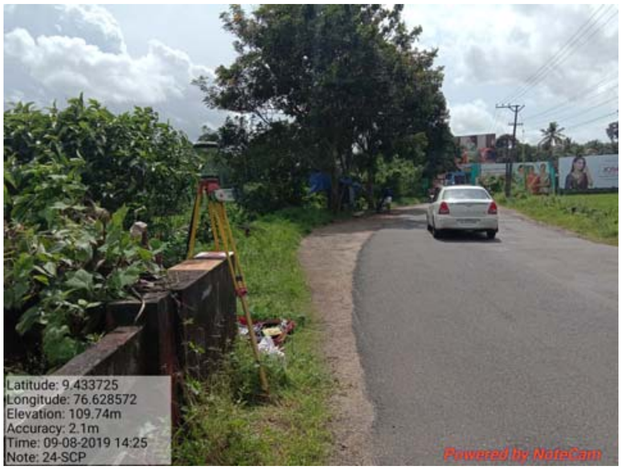
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 26' 01.29567" N	76° 37' 42.91786" E	-85.535	678809.275	1043217.277	10.802

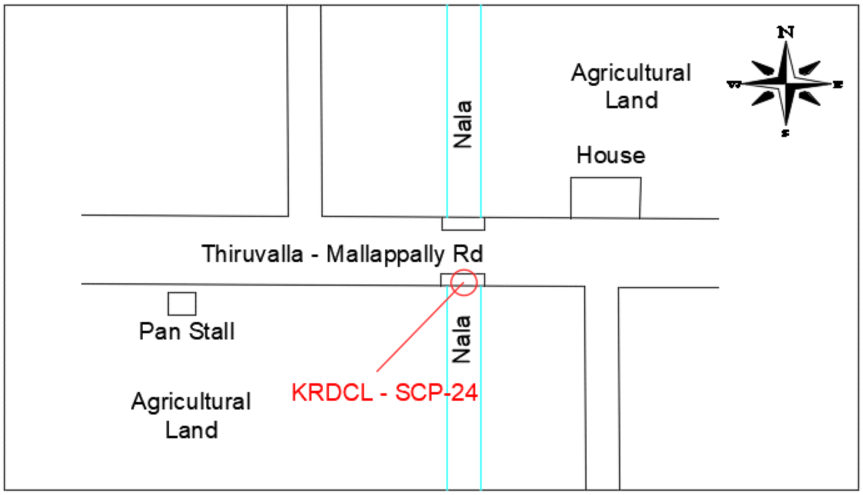
DESCRIPTION	The survey station, KRDCL-024-SCP is marked with red and white paint and nail point on the top of the culvert. The survey station is on the Thituvall-Mallappally road. It is approximately 50 metres away from the electric pole.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





DGPS SURVEY REPORT

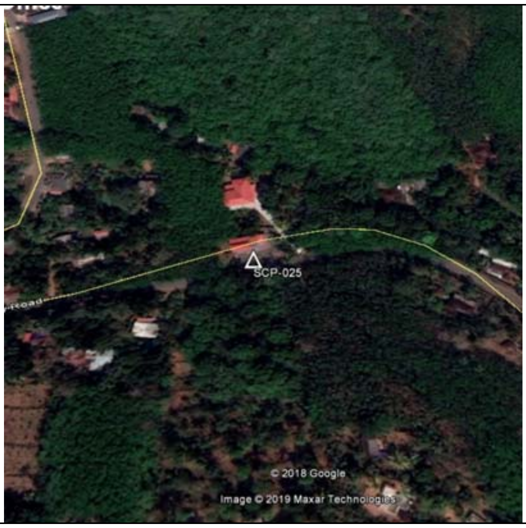
CLIENT	CONSULTANT	SURVEYED BY	DATE : 29-09-2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-025-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

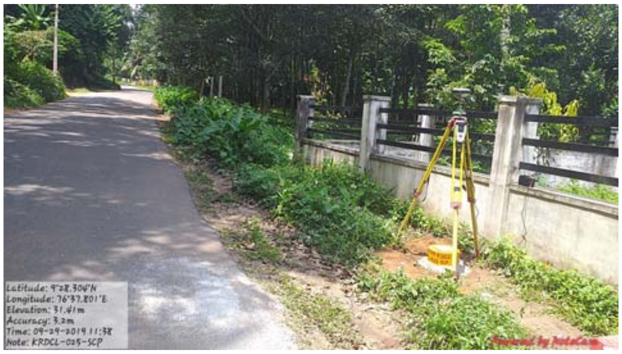
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 28' 18.35264" N	76° 37' 47.88540" E	-64.296	678941.137	1047428.778	32.072

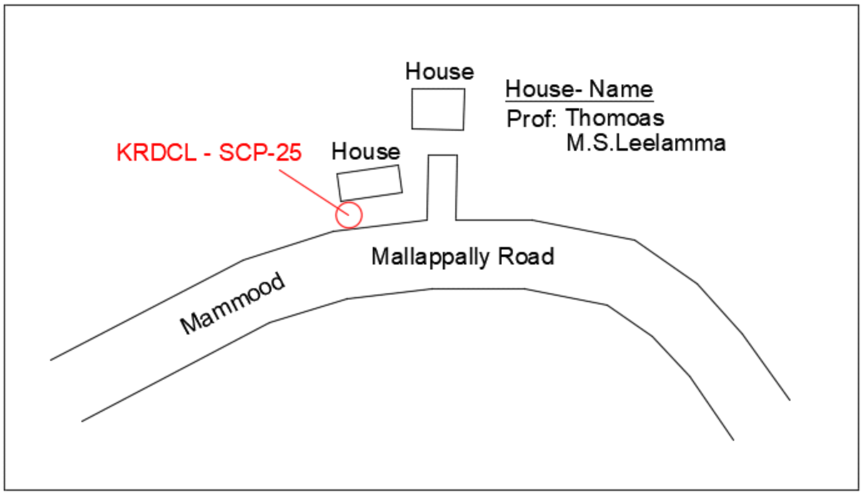
DESCRIPTION	The survey station, KRDCL-025-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Mammood-Mallapally Road. The survey station is near by residential building,santhipuram. It is approximately 30 metres away from the electric pole.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





DGPS SURVEY REPORT

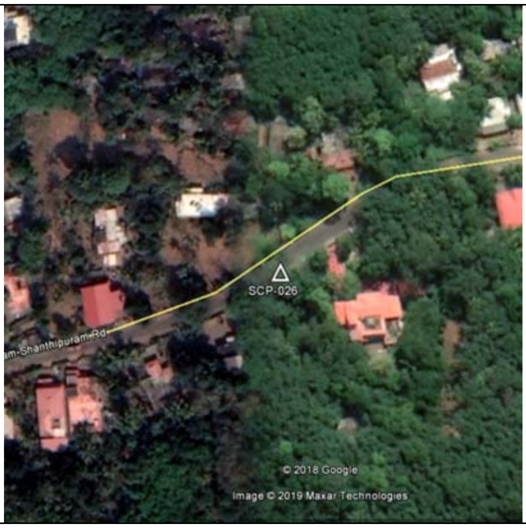
CLIENT	CONSULTANT	SURVEYED BY	DATE : 08.09.2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-026-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

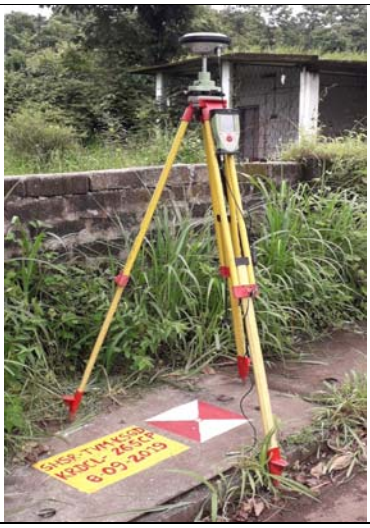
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 26' 39.56083" N	76° 37' 11.15064" E	-65.141	677834.729	1044388.385	31.198

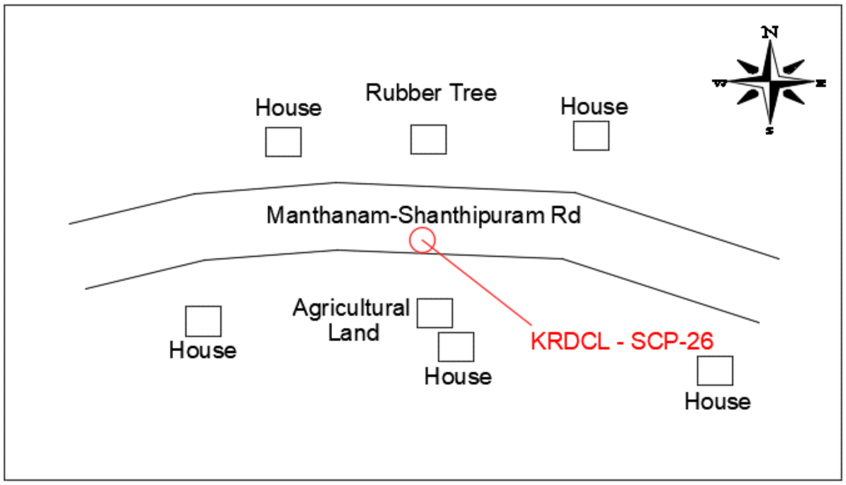
DESCRIPTION	The survey station, KRDCL-026-SCP is marked with red and white paint and nail point on the top of the Manthanam-Shanthipuram BT road. The survey station is near by rubber garden,Kunnamthanam. It is approximately 20 metres away from the residential building.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





DGPS SURVEY REPORT

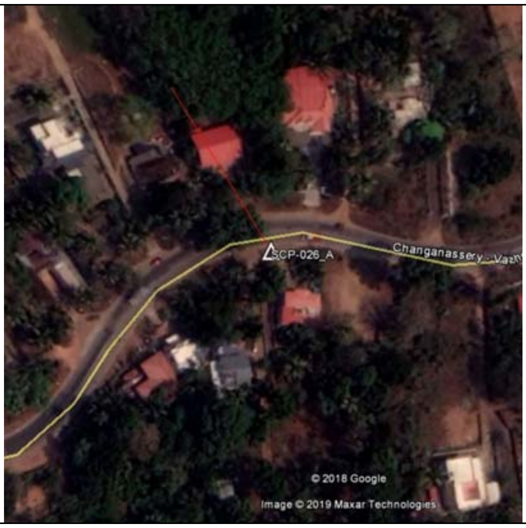
CLIENT	CONSULTANT	SURVEYED BY	DATE : 08.09.2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-026_A-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

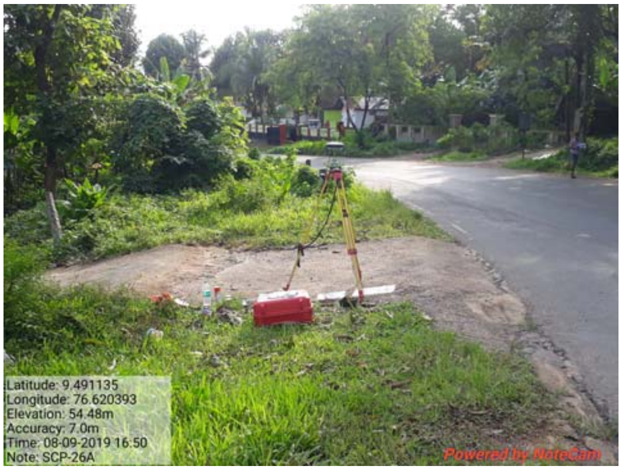
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 29' 28.04162" N	76° 37' 13.35637" E	-45.715	677877.929	1049564.904	50.660

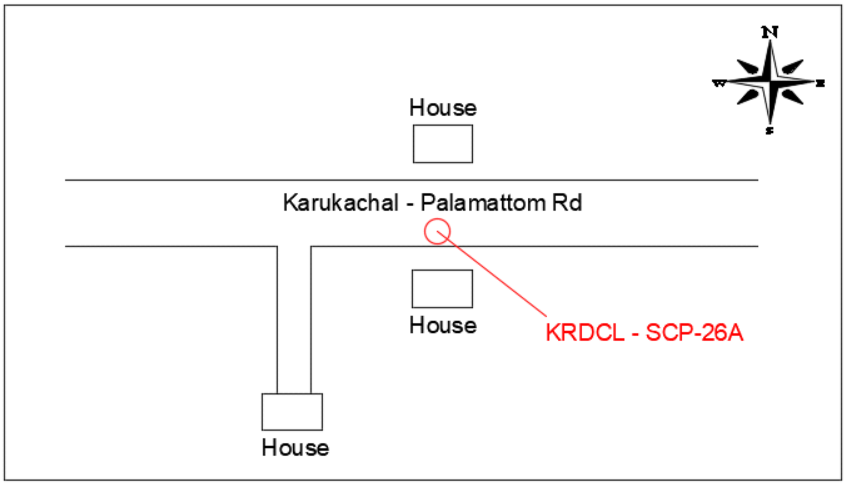
DESCRIPTION	The survey station, KRDCL-026_A-SCP is marked with red and white paint and nail point on the top of the Karukachal-Palamattam BT road. The survey station is near by karukuchal palamattom road. It is approximately 50 metres away from the electric pole.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





DGPS SURVEY REPORT

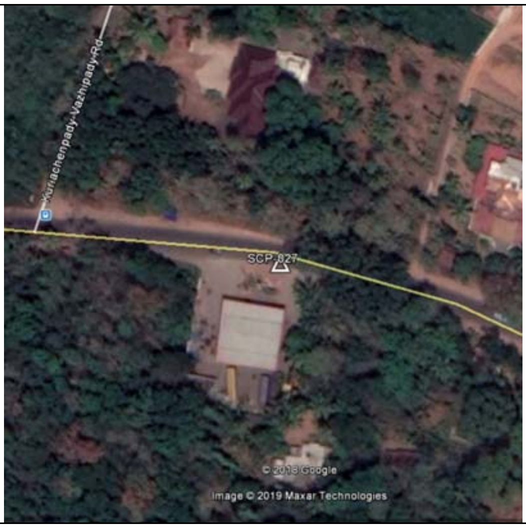
CLIENT KRDCL	CONSULTANT SYSTRA	SURVEYED BY GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DATE : 08.09.2019 DGPS POINT ID KRDCL-027-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

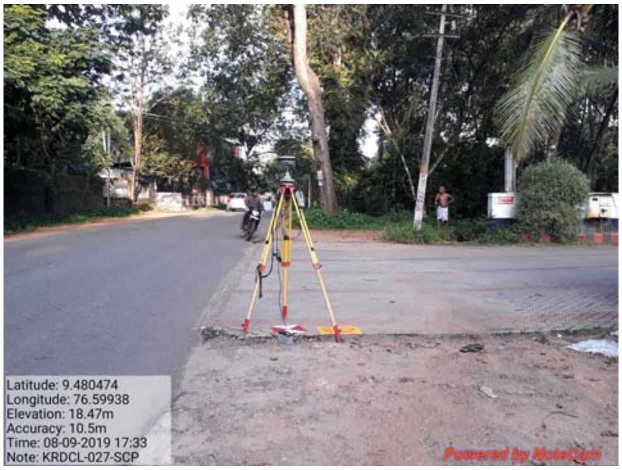
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 28' 49.74925" N	76° 35' 57.96725" E	-67.312	675583.912	1048377.808	29.026

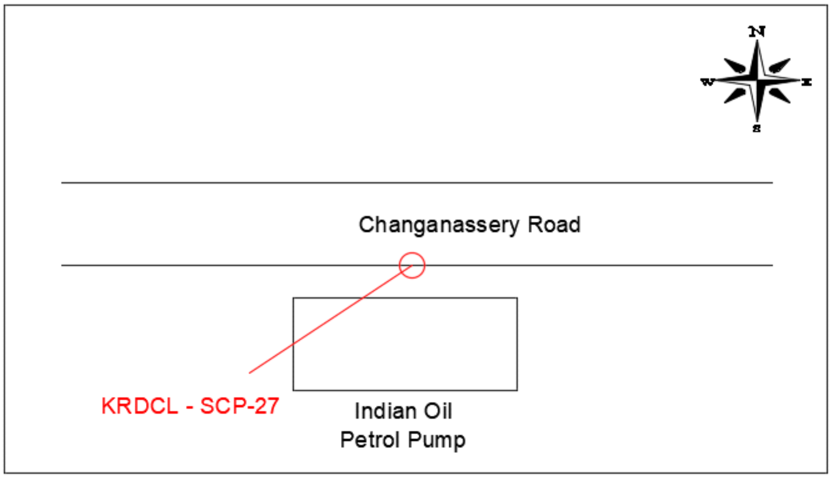
DESCRIPTION	The survey station, KRDCL-027-SCP is marked with red and white paint and nail point on the top of the foot path for the Indian oil petrol bunk. The survey station is on the side of the Changannaserry BT road. It is approximately 5 metres away from the electric pole.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





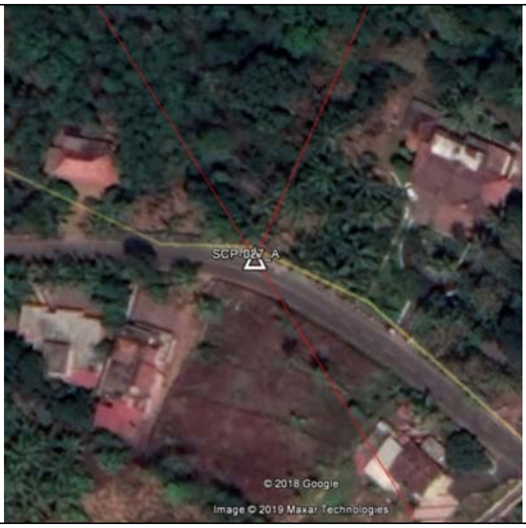
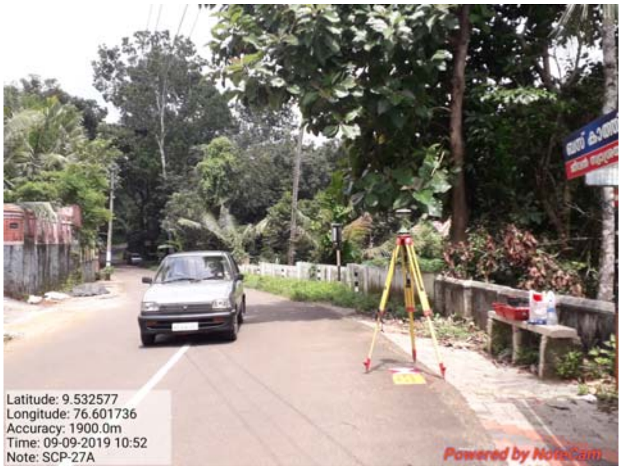
DGPS SURVEY REPORT

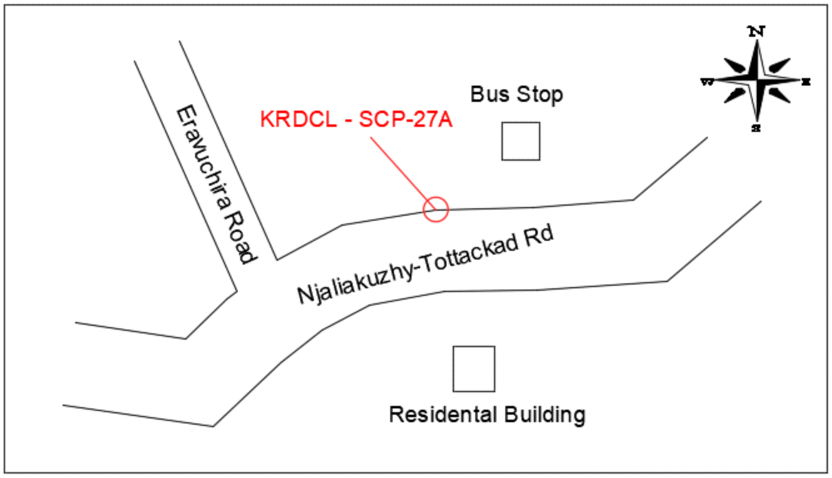
CLIENT	CONSULTANT	SURVEYED BY	DATE : 08.09.2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-027_A-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 31' 29.59052" N	76° 35' 57.95505" E	-81.083	675560.902	1053288.544	15.298

DESCRIPTION	The survey station, KRDCL-027_A-SCP is marked with red and white paint and nail point on the top of the Njaliyakuzhi-Thottackad BT road. The survey station is near by thottakad bus stop. It is approximately 50 metres away from the electric pole.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
 SCP-027_A © 2018 Google Image © 2019 Maxar Technologies	 Latitude: 9.532577 Longitude: 76.601736 Accuracy: 1900.0m Time: 09-09-2019 10:52 Note: SCP-27A Powered by NoteCam



DGPS SURVEY REPORT

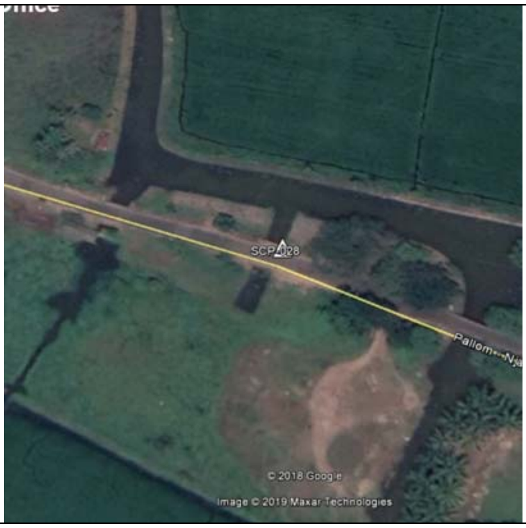
CLIENT	CONSULTANT	SURVEYED BY	DATE : 09.09.2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-028-SCP/TCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

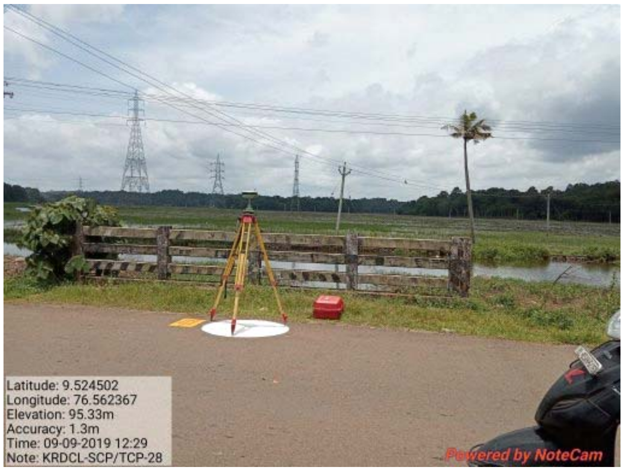
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 31' 28.36756" N	76° 33' 44.49403" E	-93.019	671490.854	1053232.383	3.261

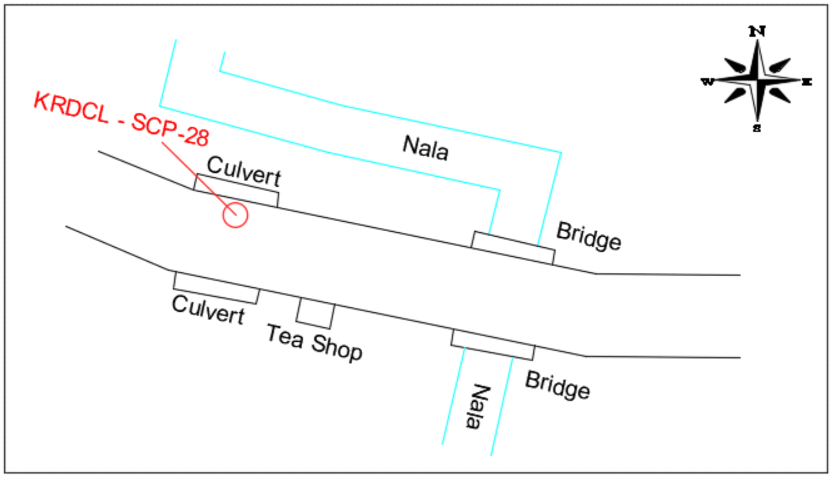
DESCRIPTION	The survey station, KRDCL-028-SCP/TCP is marked with white circular paint and nail point on the top of the culvert. The culvert is on the Pallom- Njaliakhuzhi BT road. The survey station is near by pathiyapallykkadavu bridge. It is approximately 20 metres away from the tea shop.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





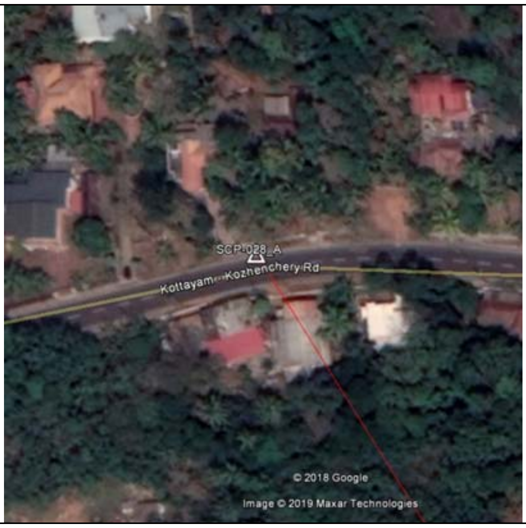
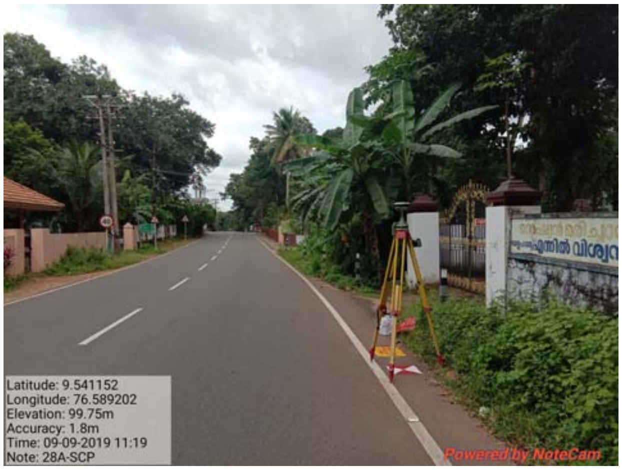
DGPS SURVEY REPORT

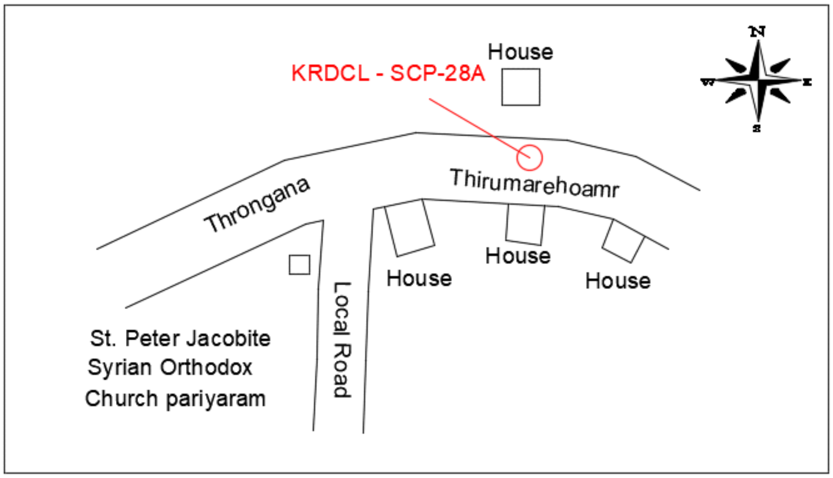
CLIENT	CONSULTANT	SURVEYED BY	DATE : 09.09.2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-028_A-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 32' 28.23383" N	76° 35' 20.94434" E	-78.165	674423.885	1055085.014	18.209

DESCRIPTION	The survey station, KRDCL-028_A-SCP is marked with red and white paint and nail point on the top of the Kottayam-Kozhencherry BT road. The survey station is near by thivenehoor road. It is approximately 50 metres away from the electric pole.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
 SCP-028_A Kottayam - Kozhenchery Rd © 2018 Google Image © 2019 Maxar Technologies	 Latitude: 9.541152 Longitude: 76.589202 Elevation: 99.75m Accuracy: 1.8m Time: 09-09-2019 11:19 Note: 28A-SCP Powered by NoteCam



DGPS SURVEY REPORT

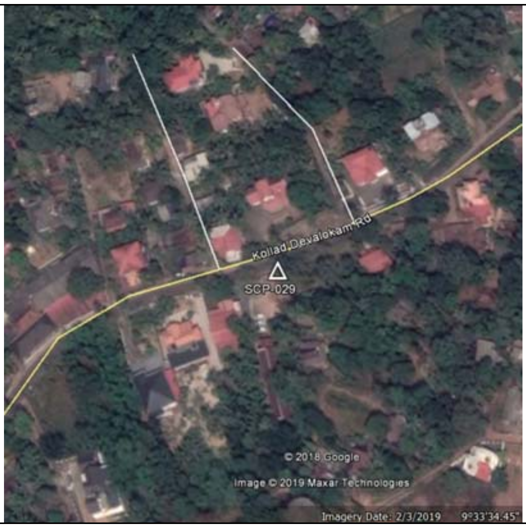
CLIENT	CONSULTANT	SURVEYED BY	DATE : 09.09.2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-029-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

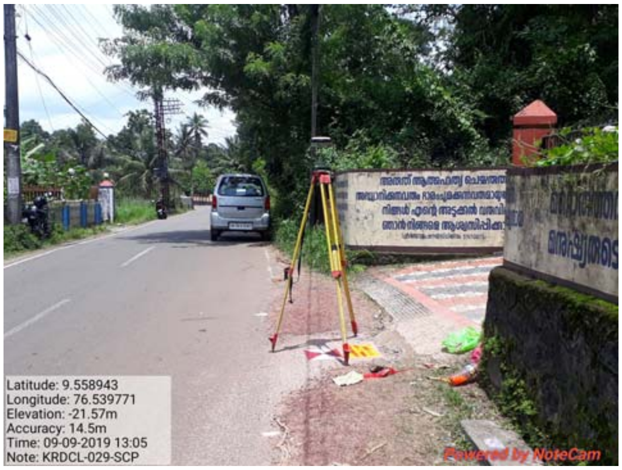
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 33' 32.85471" N	76° 32' 23.50950" E	-76.635	669004.022	1057045.789	19.606

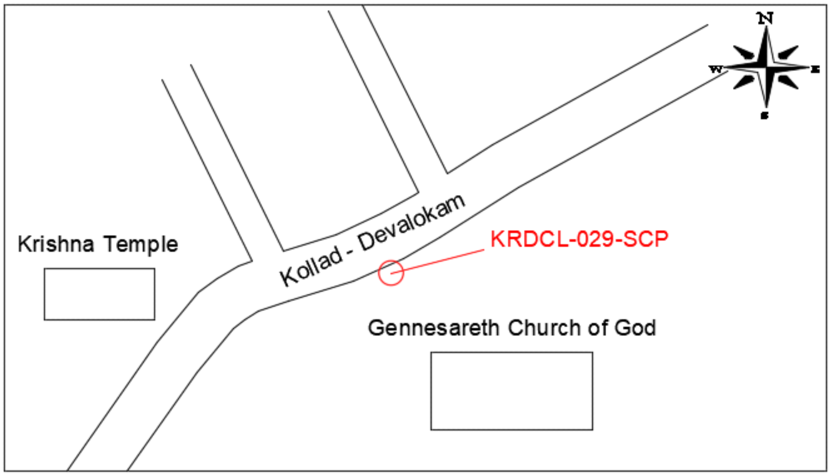
DESCRIPTION	The survey station, KRDCL-029-SCP is marked with red and white paint and nail point on the top of the Kollad-Devalokam BT road. The survey station is near by gennesarath church. It is approximately 5 metres away from the electric pole.

LOCATION ON GOOGLE MAP


Kollad Devalokam Rd
SCP-029
© 2018 Google
Image © 2019 Maxar Technologies
Imagery Date: 2/3/2019 9°33'34.45"

FIELD PHOTOGRAPH


Latitude: 9.558943
Longitude: 76.539771
Elevation: -21.57m
Accuracy: 14.5m
Time: 09-09-2019 13:05
Note: KRDCL-029-SCP



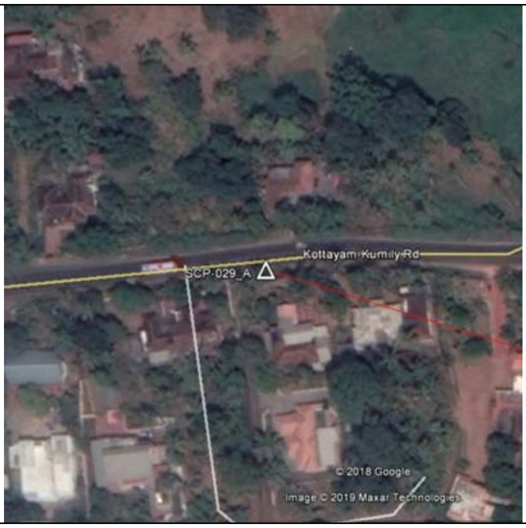
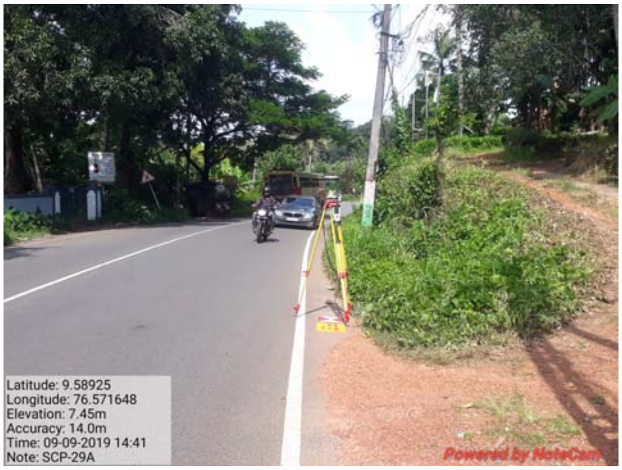
DGPS SURVEY REPORT

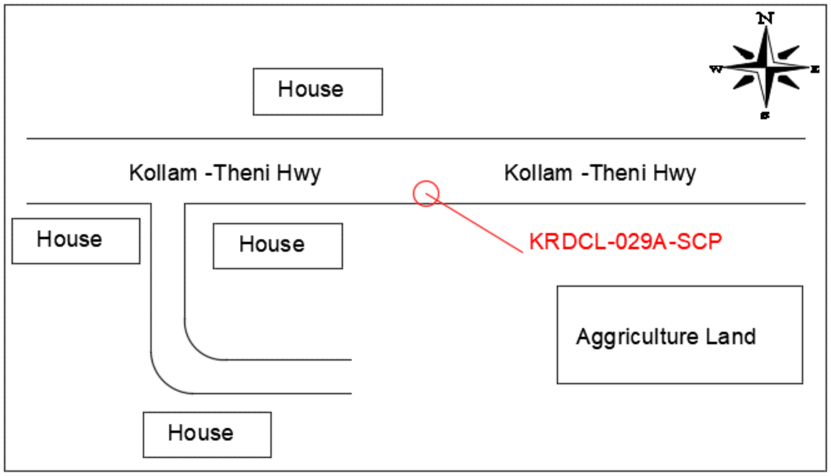
CLIENT	CONSULTANT	SURVEYED BY	
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DATE : 09.09.2019 DGPS POINT ID KRDCL-029_A-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 35' 21.41954" N	76° 34' 18.36883" E	-86.671	672491.324	1060396.950	9.684

DESCRIPTION	The survey station, KRDCL-029_A-SCP is marked with red and white paint and nail point on the top of the Kottayam-Kumily BT road. The survey station is near by kollam theni highway. It is approximately 5 metres away from the electric pole.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
 Kottayam-Kumily Rd SCP-029_A © 2018 Google Image © 2019 Maxar Technologies	 Latitude: 9.58925 Longitude: 76.571648 Elevation: 7.45m Accuracy: 14.0m Time: 09-09-2019 14:41 Note: SCP-29A Powered by NoteCam



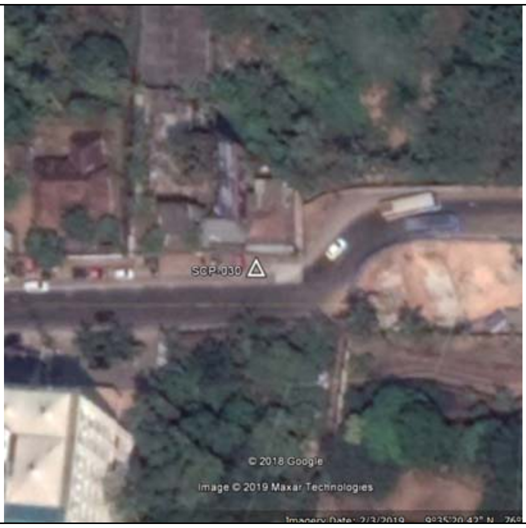
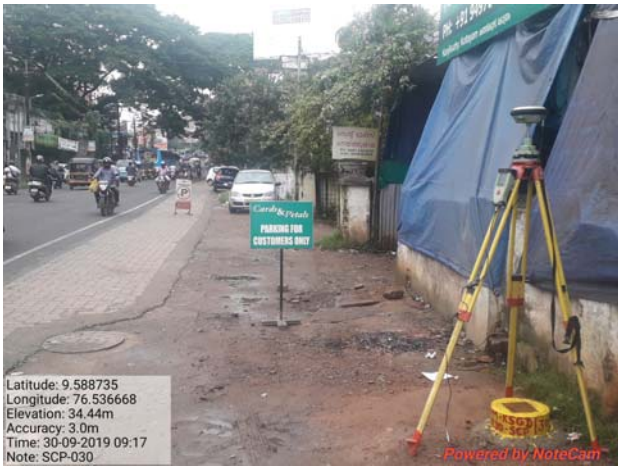
DGPS SURVEY REPORT

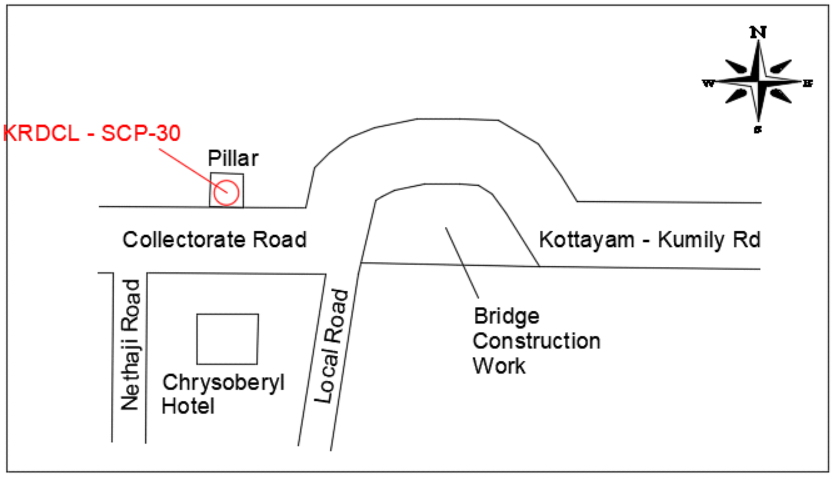
CLIENT	CONSULTANT	SURVEYED BY	DATE : 30-09-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-030-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 35' 19.55435" N	76° 32' 11.92100" E	-68.811	668636.019	1060322.221	27.423

DESCRIPTION	The survey station, KRDCL-030-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Kottayam-Kumily Road. The survey station is near by chrysoberyl hotel,kanjikuzhy. It is approximately 200 metres away from the railway track.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
 SCP-030 © 2018 Google Image © 2019 Maxar Technologies Imagery Date: 2/3/2019 9°35'20.42" N 76°	 Latitude: 9.588735 Longitude: 76.536668 Elevation: 34.44m Accuracy: 3.0m Time: 30-09-2019 09:17 Note: SCP-030 Powered by NoteCam



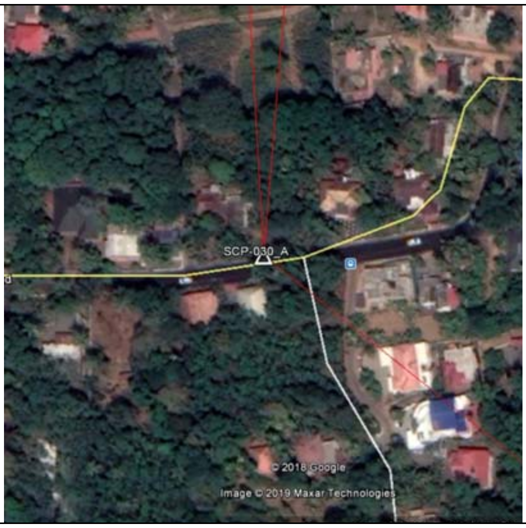
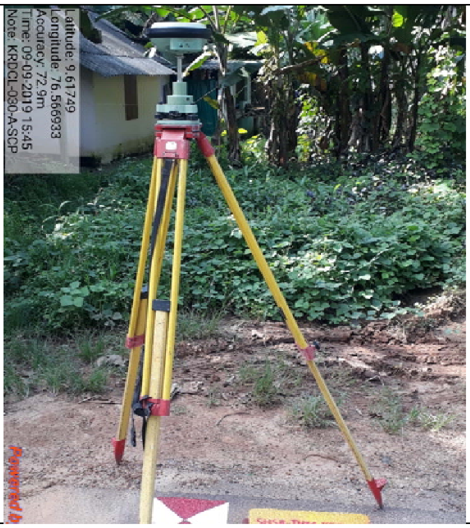
DGPS SURVEY REPORT

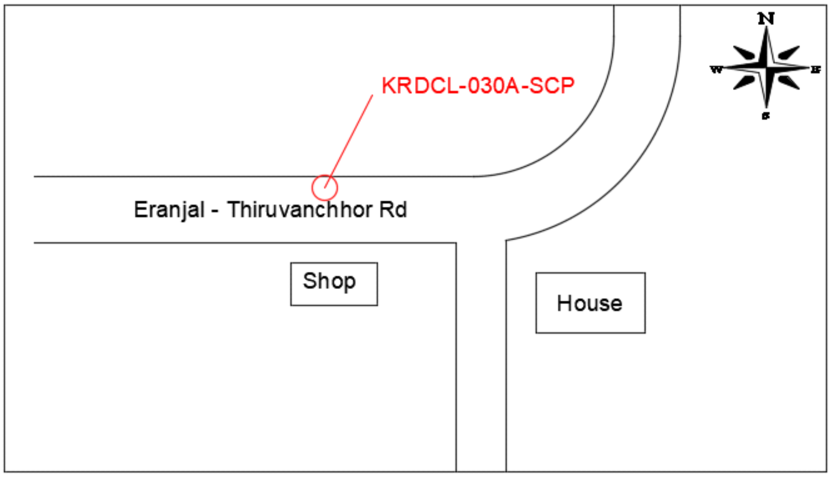
CLIENT	CONSULTANT	SURVEYED BY	DATE : 09.09.2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-030_A-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 37' 02.99232" N	76° 34' 00.16587" E	-90.550	671922.049	1063514.965	5.802

DESCRIPTION	The survey station, KRDCL-030_A-SCP is marked with red and white paint and nail point on the top of the Eranjal-Thiruvenchoor BT road. The survey station is near by residenttial building no: 34, chettipadi village. It is approximately 10 metres away from the provisional store.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
 SCP-030_A © 2018 Google Image © 2019 Maxar Technologies	 Latitude: 9.61749 Longitude: 76.566933 Accuracy: 72.9m Time: 09-09-2019 15:45 Note: KRDCL-030-A-SCP Powered b



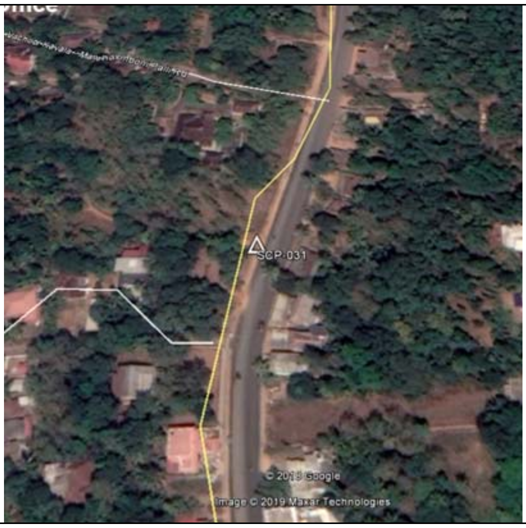
DGPS SURVEY REPORT

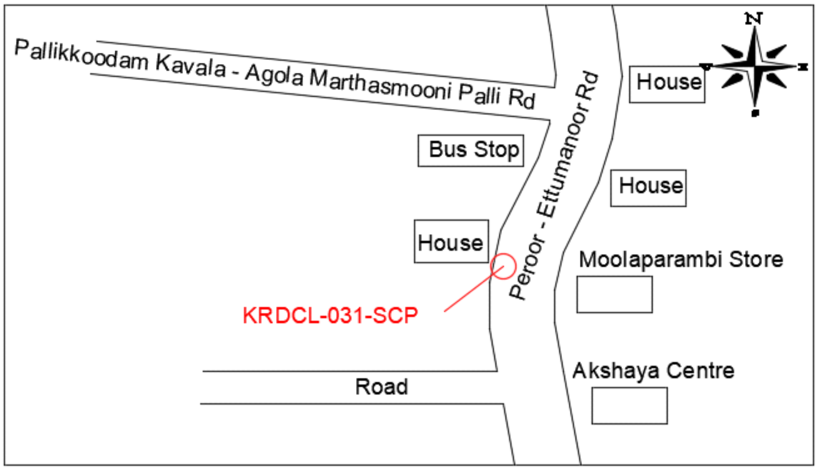
CLIENT	CONSULTANT	SURVEYED BY	DATE : 09.09.2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-031-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 38' 28.08469" N	76° 33' 55.33107" E	-87.599	671762.691	1066128.527	8.757

DESCRIPTION	The survey station, KRDCL-031-SCP is marked with red and white paint and nail point on the top of the Peroor- Ettumannur BT road. The survey station is near by vechoor kavala bus stop,peroor. It is approximately 15 metres away from the Akshya centre.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	



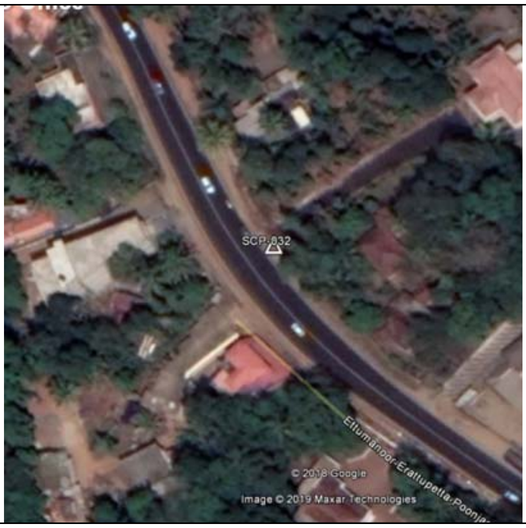
DGPS SURVEY REPORT

CLIENT	CONSULTANT	SURVEYED BY	DATE : 09.09.2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-032-SCP/TCP

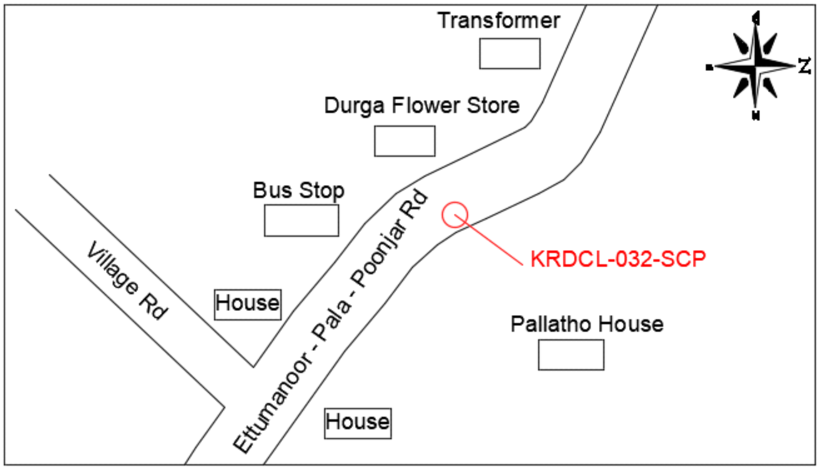
PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 40' 15.15576" N	76° 34' 16.41091" E	-84.501	672390.215	1069420.958	11.888

DESCRIPTION	The survey station, KRDCL-032-SCP/TCP is marked with white circular paint and nail point on the top of the Ettumanoor-pala-poonjan BT road. The survey station is near by bus stop. It is approximately 30 metres away from the sign board.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	

SCP-032
Ettumanoor-Erattupetta-Poonjar
© 2018 Google
Image © 2019 Maxar Technologies



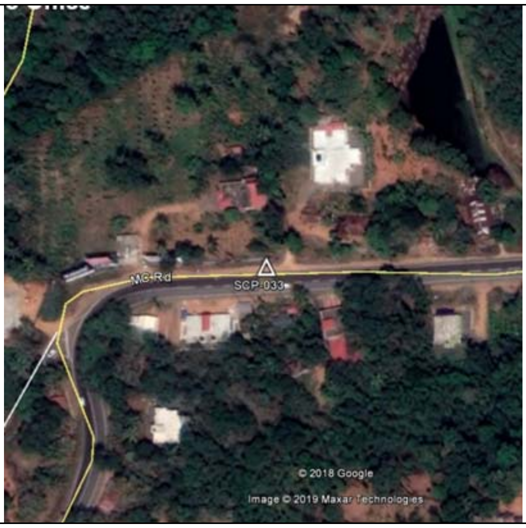
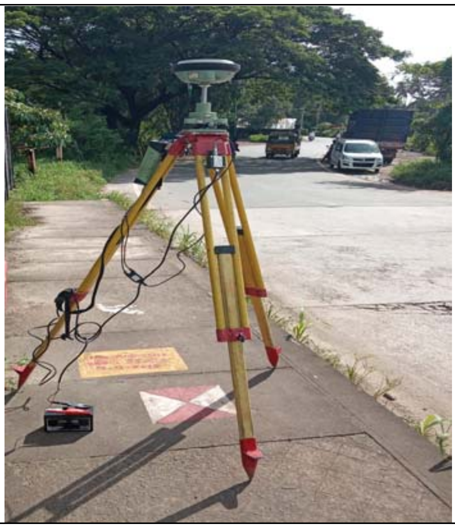
DGPS SURVEY REPORT

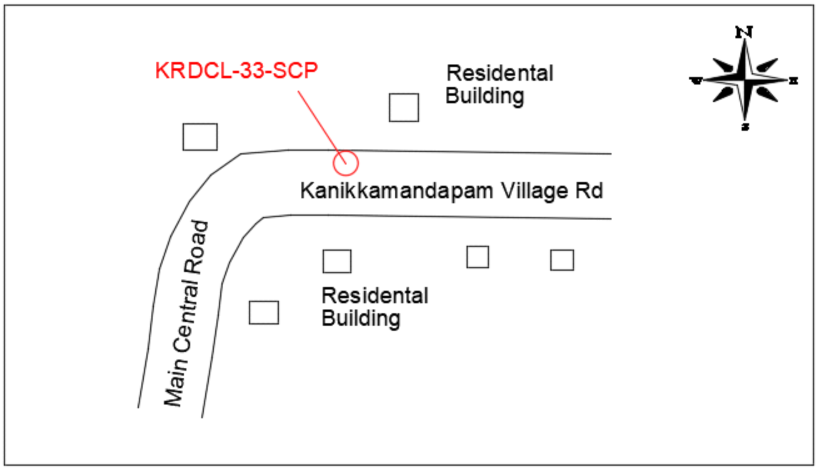
CLIENT	CONSULTANT	SURVEYED BY	DATE : 09.09.2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-033-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 42' 35.28308" N	76° 33' 18.39844" E	-65.426	670602.083	1073717.881	30.908

DESCRIPTION	The survey station, KRDCL-033-SCP is marked with red and white paint and nail point on the top of the Kannikamandabam Village BT road. The survey station is near by MC road, Vempally. It is approximately 10 metres away from the residential building.

LOCATION ON GOOGLE MAP	**FIELD PHOTOGRAPH**
 MC Rd SCP 033 © 2018 Google Image © 2019 Maxar Technologies	



DGPS SURVEY REPORT

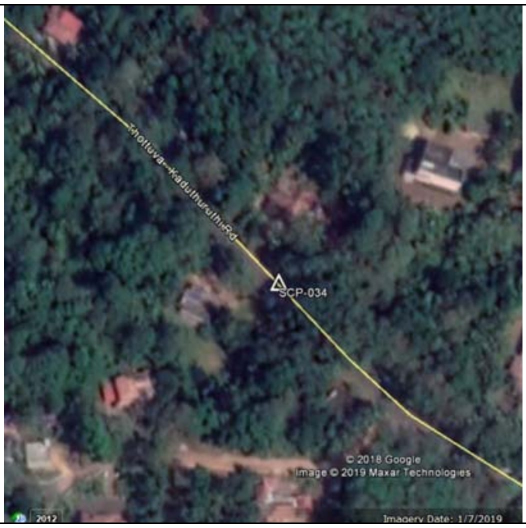
CLIENT KRDCL	CONSULTANT SYSTRA	SURVEYED BY GEO KNO	DATE : 09.09.2019
			DGPS POINT ID
			KRDCL-034-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

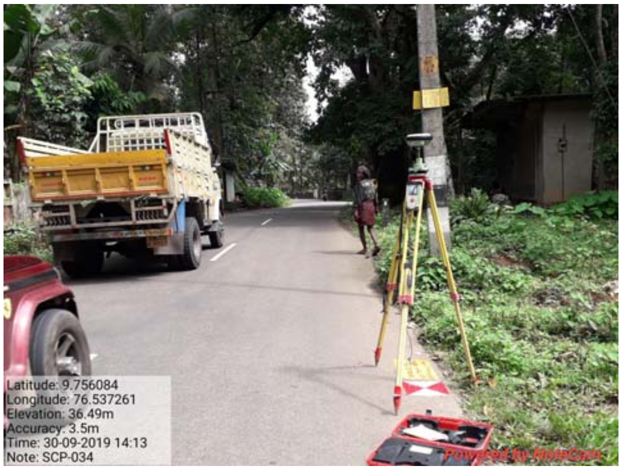
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 45' 22.03899" N	76° 32' 13.87446" E	-66.555	668612.127	1078832.019	29.715

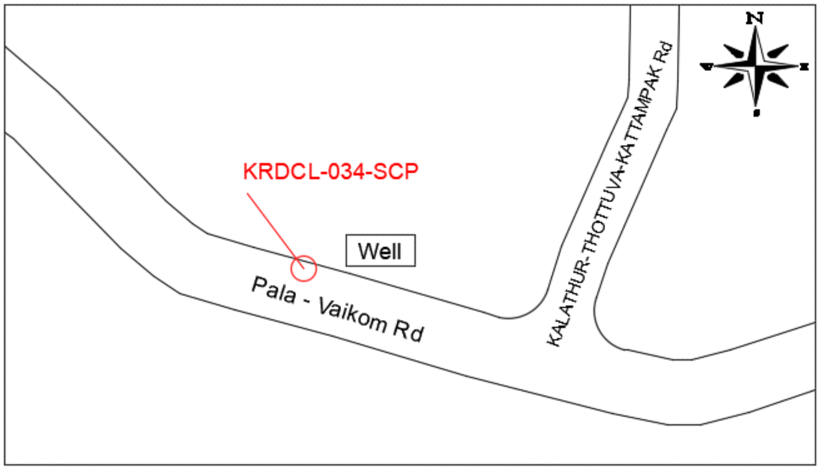
DESCRIPTION	The survey station, KRDCL-034-SCP is marked with red and white paint and nail point on the top of the Pala-Vaikom BT road. The survey station is near by pala vaikkam road. It is approximately 5 metres away from the electric pole.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





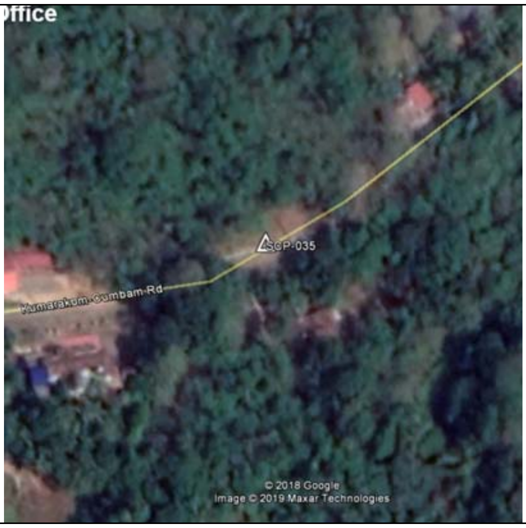
DGPS SURVEY REPORT

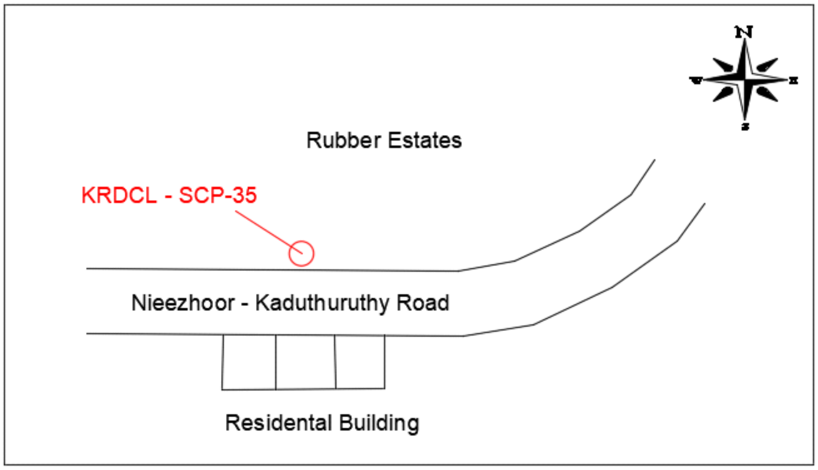
CLIENT	CONSULTANT	SURVEYED BY	DATE : 30-09-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-035-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 47' 02.11412" N	76° 30' 55.63209" E	-84.976	666213.819	1081895.747	11.205

DESCRIPTION	The survey station, KRDCL-035-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Nieezhoor-Kaduthuruthy road. The survey station is near by residential building,njeezhoor. It is approximately 20 metres away from the electric pole.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
 Office SCP-035 Kumarakom-Cumbam-Rd © 2018 Google Image © 2019 Maxar Technologies	Latitude: 9°47.032'N Longitude: 76°30.927'E Elevation: 14.76m Accuracy: 3.2m Time: 09-30-2019 13:31 Note: KRDCL-035-SCP Powered by NoteCam



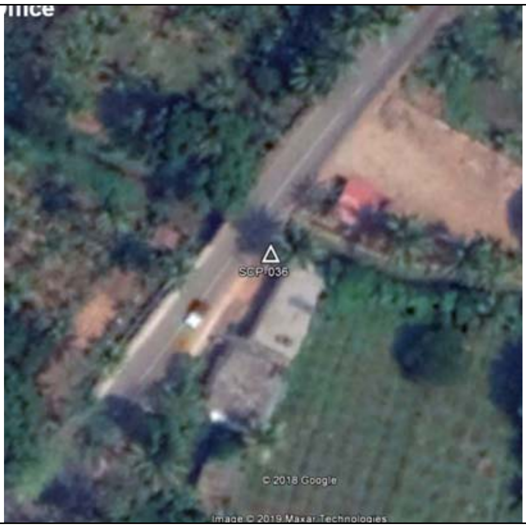
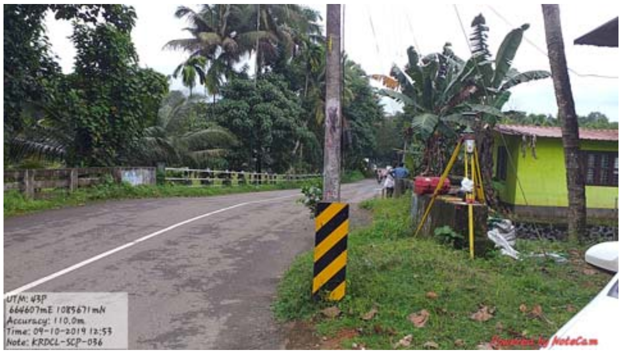
DGPS SURVEY REPORT

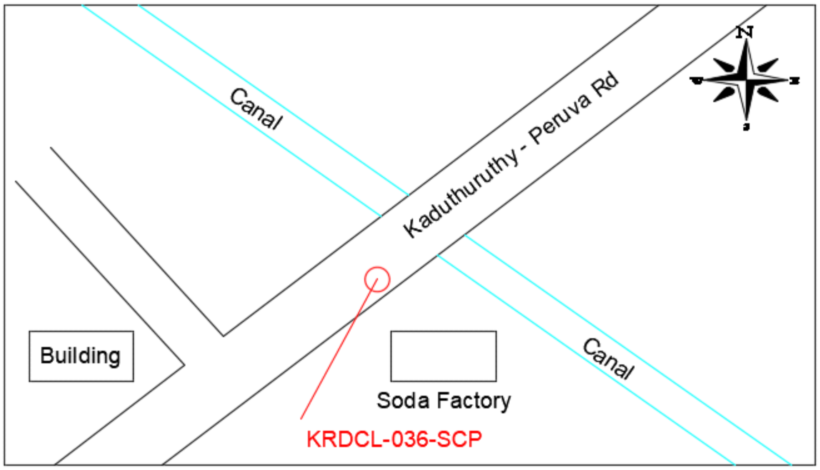
CLIENT	CONSULTANT	SURVEYED BY	
KRDCL			DATE : 09.09.2019
			DGPS POINT ID
			KRDCL-036-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 49' 06.92955" N	76° 30' 05.36814" E	-86.980	664665.010	1085723.439	9.177

DESCRIPTION	The survey station, KRDCL-036-SCP is marked with red and white paint and nail point on the top of the culvert near the Kaduthuruthy-Peruva BT road. The survey station is near by soda factory,kaduthuruthy. It is approximately 2 metres away from the electric pole.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
 ffice SCP 036 © 2018 Google Image © 2019 Maxar Technologies	 UTM: 43P 664607mE 1085671mN Accuracy: 110.0m Time: 09-10-2019 12:53 Note: KRDCL-SCP-036



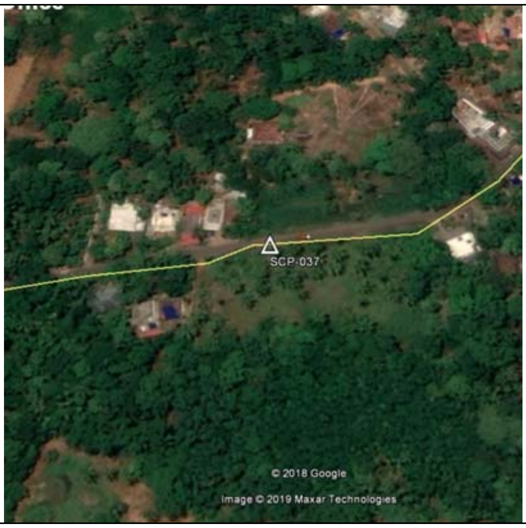
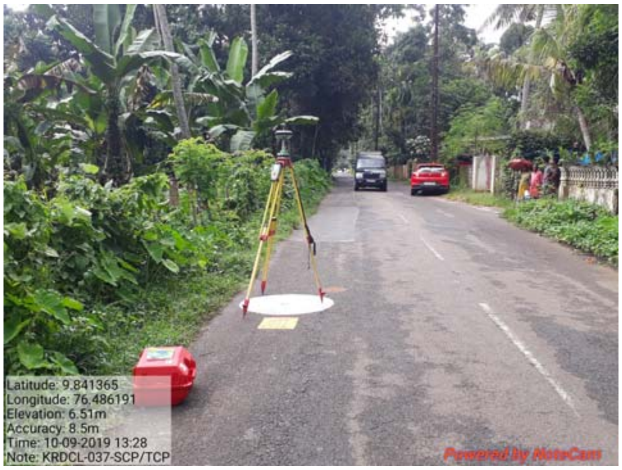
DGPS SURVEY REPORT

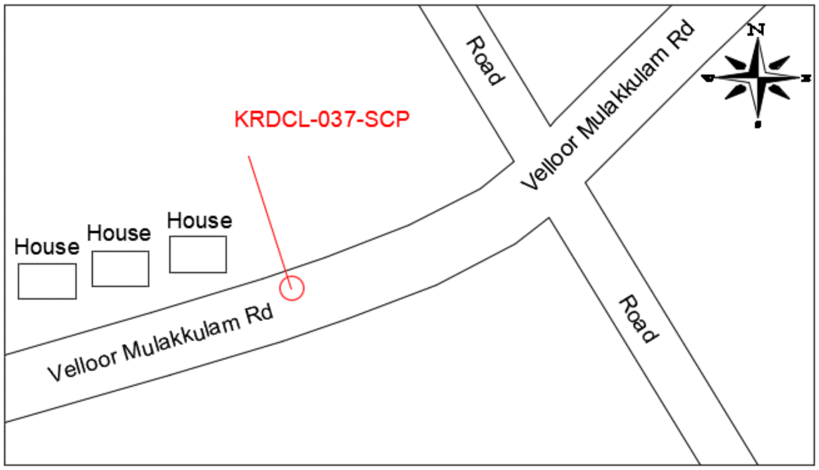
CLIENT	CONSULTANT	SURVEYED BY	DATE : 10.09.2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-037-SCP/TCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 50' 28.96826" N	76° 29' 10.23248" E	-90.450	662973.877	1088236.327	5.667

DESCRIPTION	The survey station, KRDCL-037-SCP/TCP is marked with white circular paint and nail point on the top of the Vellore-Moolakulam BT road. The survey station is near by residential building,mulakulam. It is approximately 10 metres away from the electric pole.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	 Latitude: 9.841365 Longitude: 76.486191 Elevation: 6.51m Accuracy: 8.5m Time: 10-09-2019 13:28 Note: KRDCL-037-SCP/TCP Powered by NoteCam



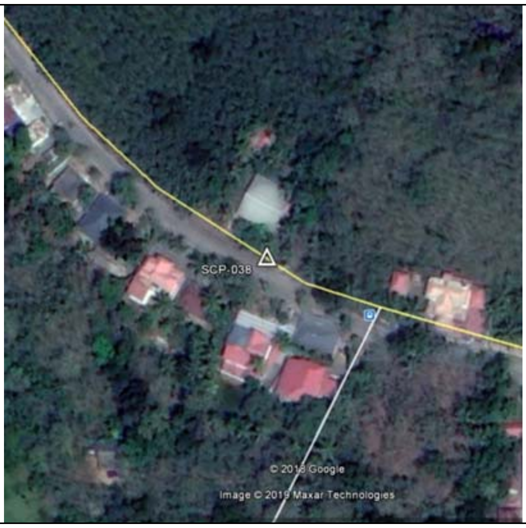
DGPS SURVEY REPORT

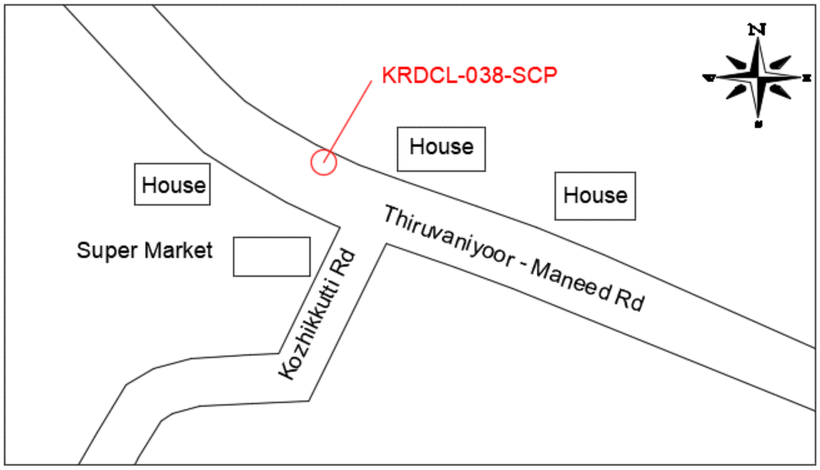
CLIENT	CONSULTANT	SURVEYED BY	DATE : 10.09.2019
			DGPS POINT ID
			KRDCL-038-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 54' 25.17112" N	76° 27' 02.76161" E	-83.857	659058.664	1095475.742	12.248

DESCRIPTION	The survey station, KRDCL-038-SCP is marked with red and white paint and nail point on the top of the Thiruvaniyoor-Maneed BT road. The survey station is near by puthumlli residential building,maneed. It is approximately 10 metres away from the super market.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	



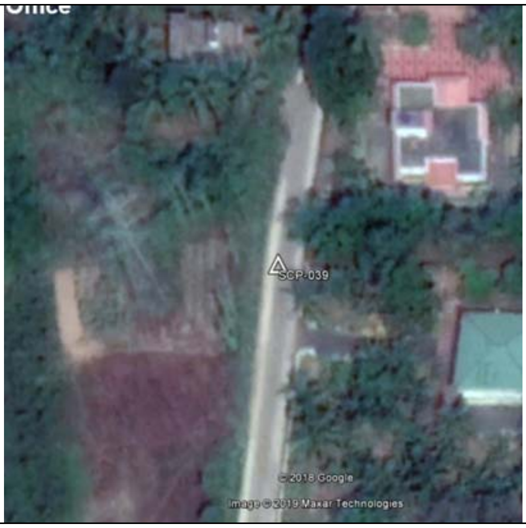
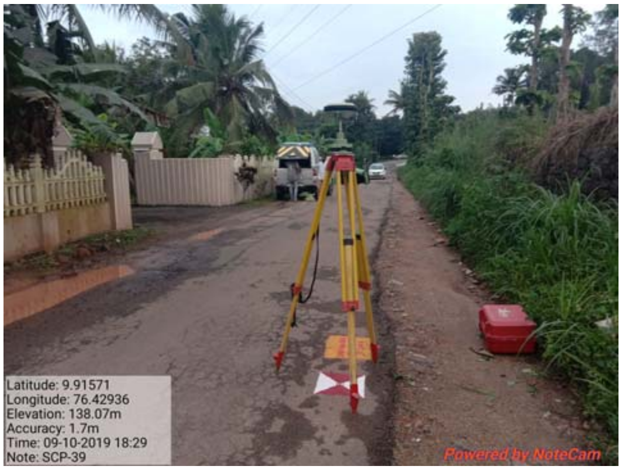
DGPS SURVEY REPORT

CLIENT	CONSULTANT	SURVEYED BY	DATE : 10.09.2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-039-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

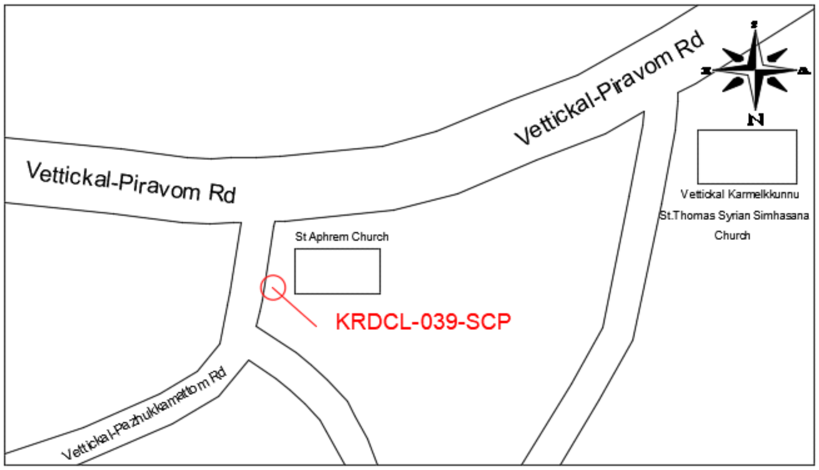
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 54' 56.44304" N	76° 25' 45.68106" E	-45.700	656706.593	1096426.291	50.376

DESCRIPTION	The survey station, KRDCL-039-SCP is marked with red and white paint and nail point on the top of the Vettikal-Pazhukamattom BT road. The survey station is near by Saint Aphem church. It is approximately 5 metres away from the residential building.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	

Map overlay: Office; SCP-039; ©2018 Google; Image ©2019 Maxar Technologies

Photo overlay:
Latitude: 9.91571
Longitude: 76.42936
Elevation: 138.07m
Accuracy: 1.7m
Time: 09-10-2019 18:29
Note: SCP-39
Powered by NoteCam



Vettickal-Piravom Rd
Vettickal-Piravom Rd
N
Vettickal Karmelkkunnu St.Thomas Syrian Simhasana Church
St Aphrem Church
KRDCL-039-SCP
Vettickal-Pazhukkamattom Rd

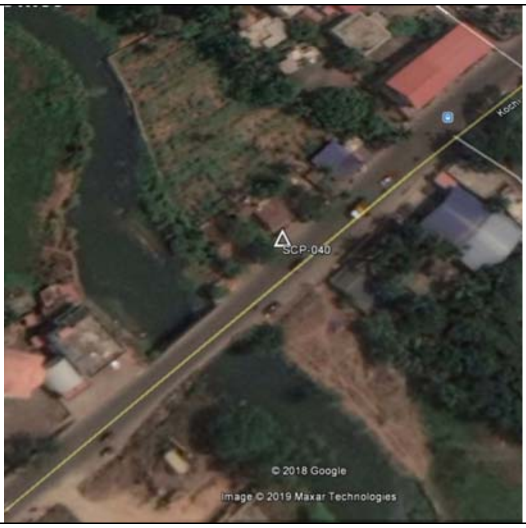
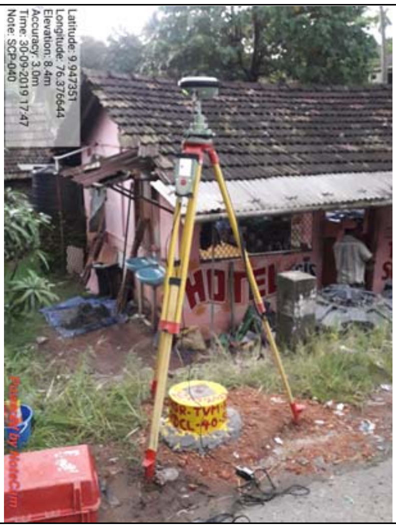
DGPS SURVEY REPORT

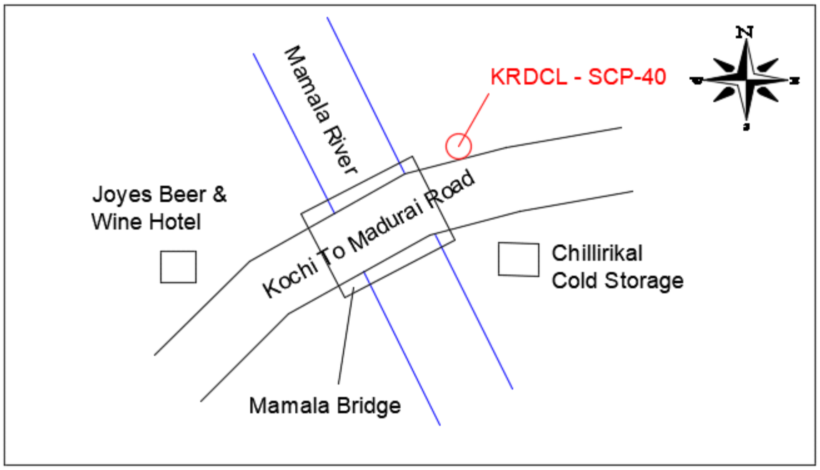
CLIENT	CONSULTANT	SURVEYED BY	DATE : 30-09-2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-040-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
9° 56' 50.67008" N	76° 22' 35.88456" E	-91.555	650910.912	1099911.005	4.449

DESCRIPTION	The survey station, KRDCL-040-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Kochi-Madurai road. The survey station is near by hotel joyce,mamala. It is approximately 20 metres away from the river.

LOCATION ON GOOGLE MAP	**FIELD PHOTOGRAPH**
 SCP-040 Kochi © 2018 Google Image © 2019 Maxar Technologies	 Latitude: 9.9473351 Longitude: 76.3766644 Elevation: 8.4m Accuracy: 3.0m Time: 30-09-2019 17:47 Note: SCP-040 HOTEL KR-TVM KRDCL-40



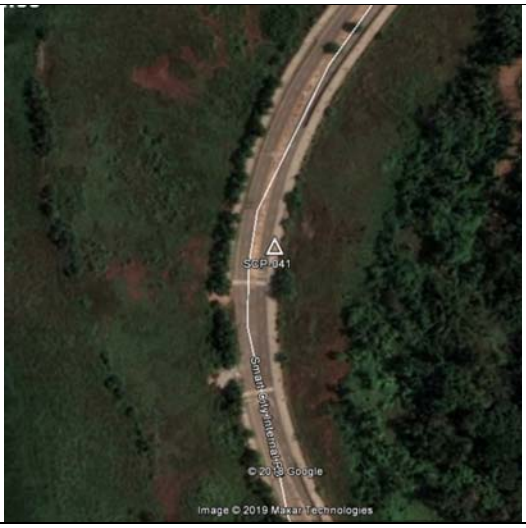
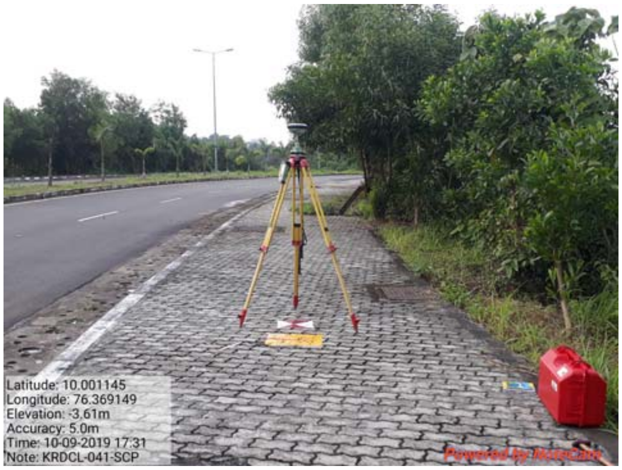
DGPS SURVEY REPORT

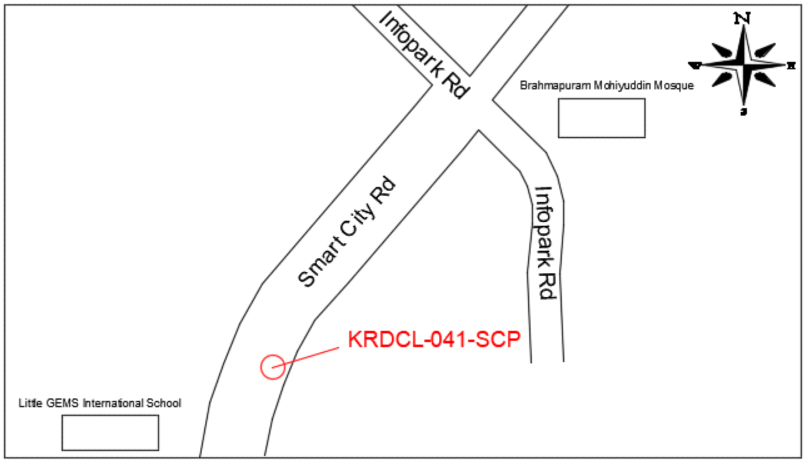
CLIENT	CONSULTANT	SURVEYED BY	DATE : 10.09.2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID
			KRDCL-041-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
10° 00' 04.25570" N	76° 22' 08.87198" E	-92.289	650063.588	1105854.616	3.757

DESCRIPTION	The survey station, KRDCL-041-SCP is marked with red and white paint and nail point on the top of the tiled pavement on the side of the Smart city international BT road. The survey station is near by brahmapuram mosque. It is approximately 50 metres away from the little gems international school.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
 SCP-041 Smart city International... © 2019 Google Image © 2019 Maxar Technologies	 Latitude: 10.001145 Longitude: 76.369149 Elevation: -3.61m Accuracy: 5.0m Time: 10-09-2019 17:31 Note: KRDCL-041-SCP Powered by NoteCam



Infopark Rd
Brahmapuram Mohiyuddin Mosque
N
Smart City Rd
Infopark Rd
KRDCL-041-SCP
Little GEMS International School

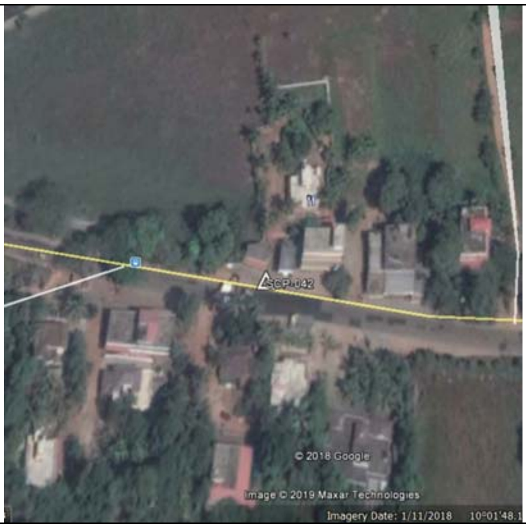
DGPS SURVEY REPORT

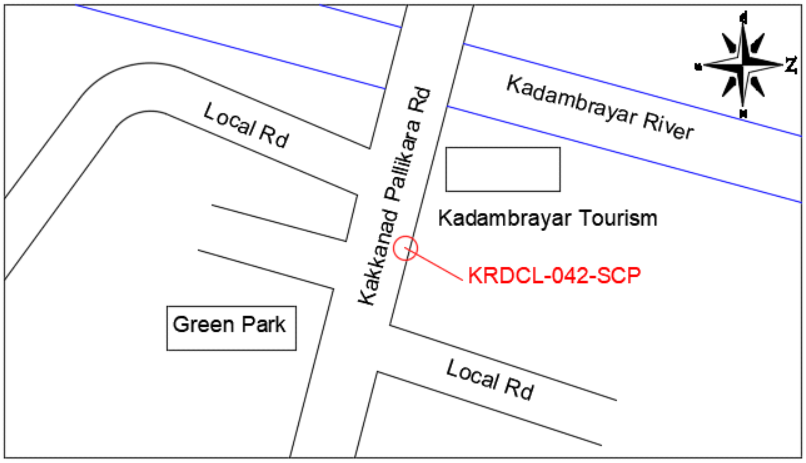
CLIENT	CONSULTANT	SURVEYED BY	DATE : 10.09.2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-042-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
10° 01' 45.73762" N	76° 23' 09.79658" E	-90.670	651905.710	1108979.951	5.442

DESCRIPTION	The survey station, KRDCL-042-SCP is marked with red and white paint and nail point on the top of the Kakkanad-Pallikara BT road. The survey station is near by kadamba river,manakkadavu. It is approximately 8 metres away from the electric pole.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
 SCP-042 © 2018 Google Image © 2019 Maxar Technologies Imagery Date: 1/11/2018 10°01'48.1	UTM: 43P 651900mE 1108977mN Elevation: 8.79m Accuracy: 3.2m Time: 09-10-2019 18:56 Note: KRDCL-SCP-042 Powered by NoteCam



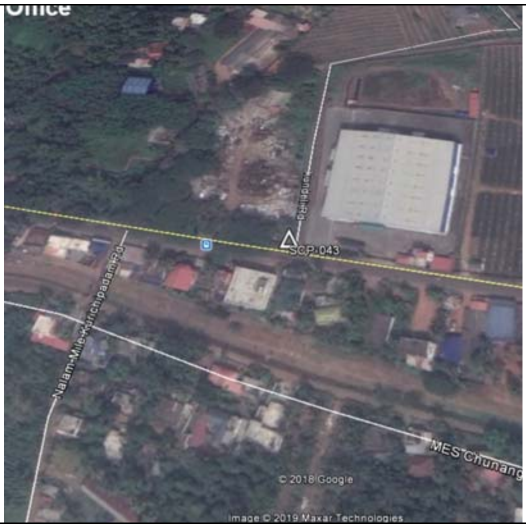
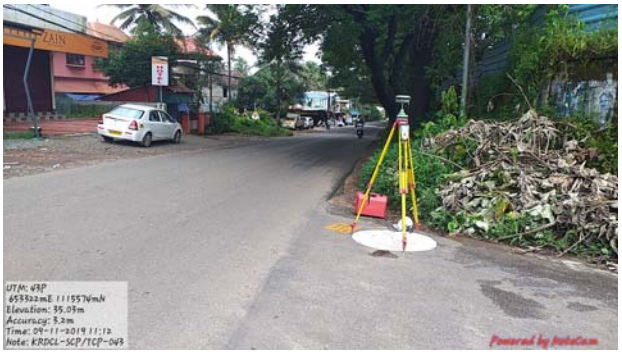
DGPS SURVEY REPORT

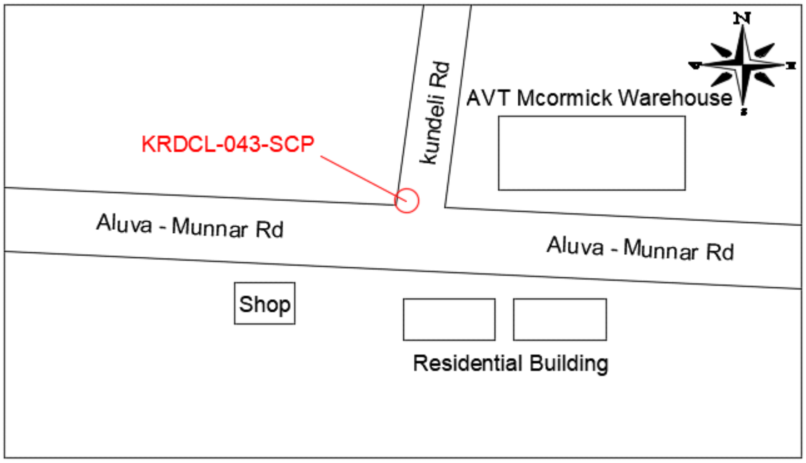
CLIENT	CONSULTANT	SURVEYED BY	DATE : 10.09.2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-043-SCP/TCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
10° 05' 20.24499" N	76° 23' 57.08273" E	-69.450	653317.410	1115575.898	26.772

DESCRIPTION	The survey station, KRDCL-043-SCP/TCP is marked with white circular paint and nail point on the top of the Aluva-Munnar BT road. The survey station is near by kundali road crossing,vazhakulam village. It is approximately 10 metres away from the zain hotel.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
 Office Kundeli Rd SCP-043 Nalam-Mile-Kurichipadam-Rd MES Chunang © 2018 Google Image © 2019 Maxar Technologies	 ZAIN UTM: 43P 653322mE 1115574mN Elevation: 35.03m Accuracy: 3.2m Time: 09-11-2019 11:12 Note: KRDCL-SCP/TCP-043 Powered by NoteCam



DGPS SURVEY REPORT

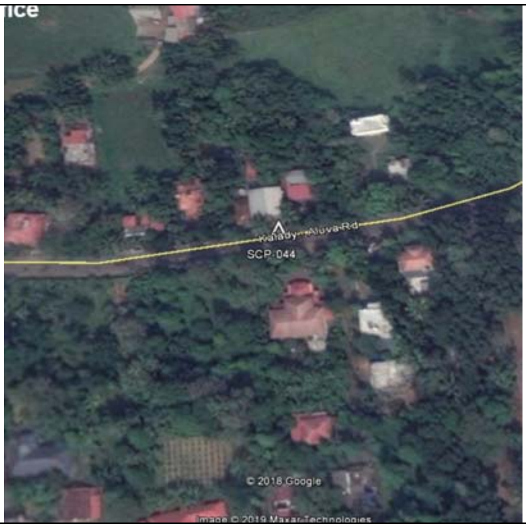
CLIENT	CONSULTANT	SURVEYED BY	DATE : 11/9/2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-044-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

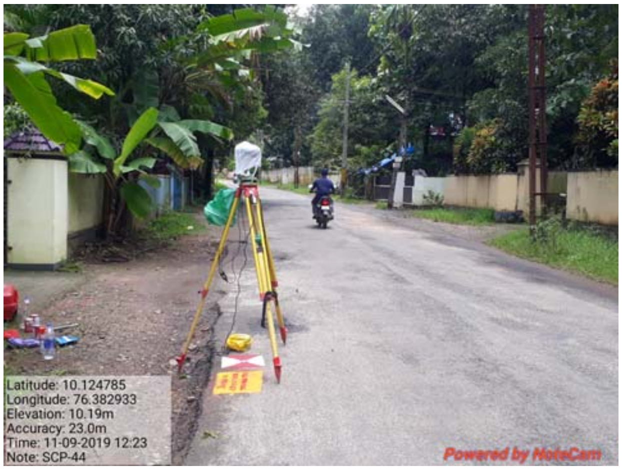
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
10° 07' 29.09765" N	76° 22' 58.93366" E	-88.073	651530.386	1119526.816	8.092

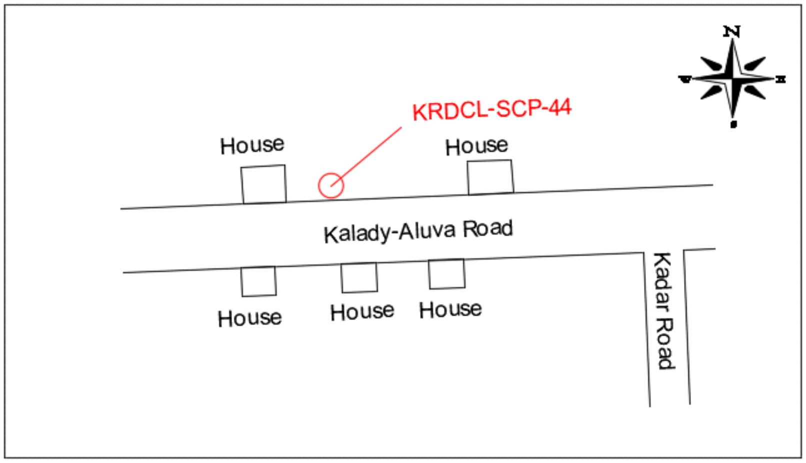
DESCRIPTION	The survey station, KRDCL-044-SCP is marked with red and white paint and nail point on the top of the Kalady-Aluva BT road. The survey station is near by house,aluva road. It is approximately 15 metres away from the electric pole.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





DGPS SURVEY REPORT

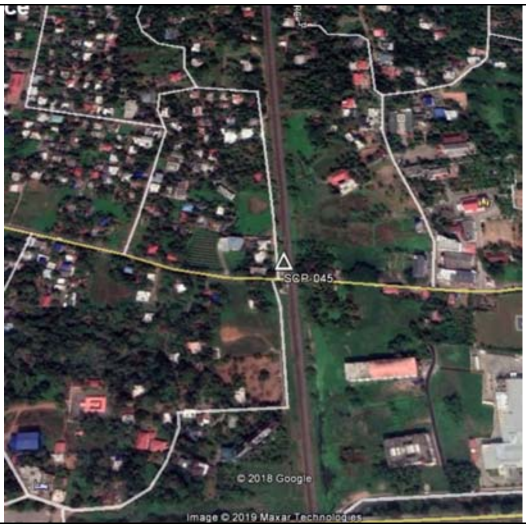
CLIENT	CONSULTANT	SURVEYED BY	DATE : 11/9/2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-045-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

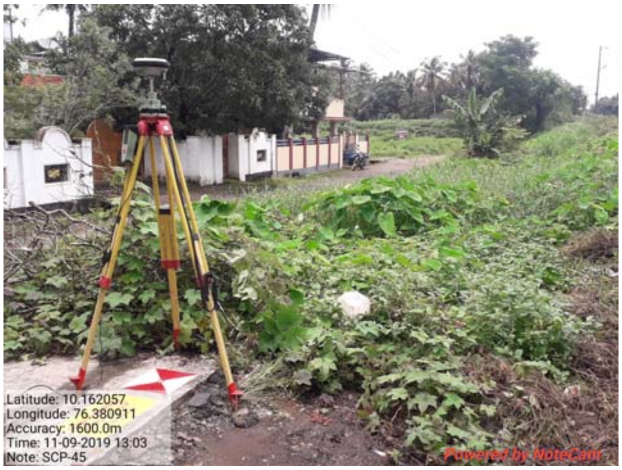
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
10° 09' 42.25275" N	76° 22' 48.55278" E	-87.545	651197.037	1123616.104	8.622

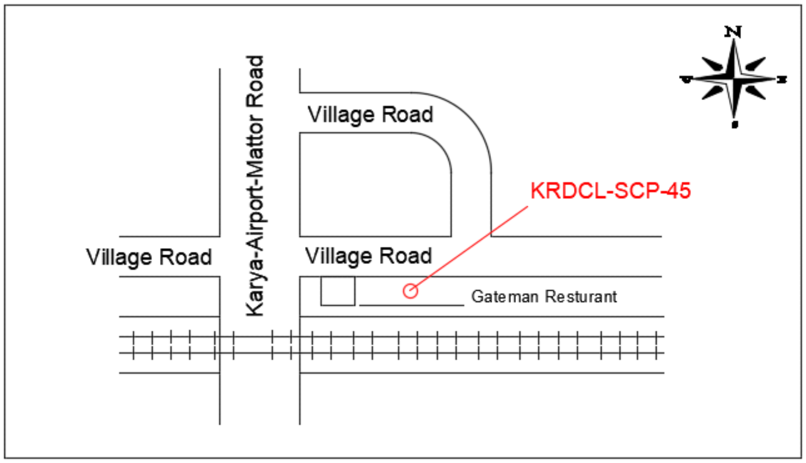
DESCRIPTION	The survey station, KRDCL-045-SCP is marked with red and white paint and nail point on the top of the Retaining structure on the side of the village BT road. The survey station is near by karyad-airport-mattoor road,nedumbassery village. It is approximately 5 metres away from the railway crossing.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





DGPS SURVEY REPORT

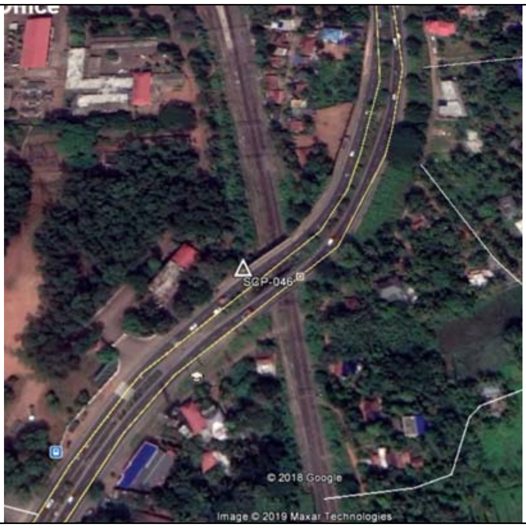
CLIENT	CONSULTANT	SURVEYED BY	DATE : 1/10/2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID
			KRDCL-046-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

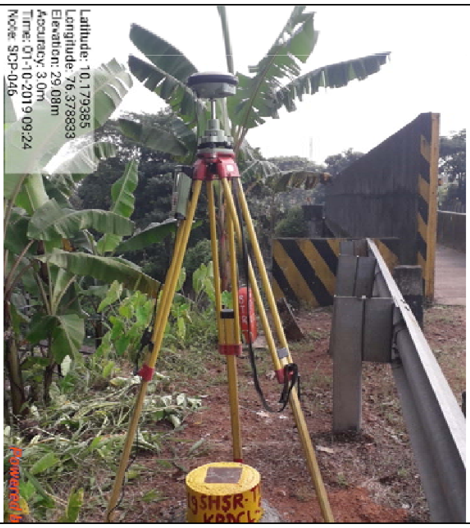
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
10° 10' 45.85100" N	76° 22' 43.88778" E	-70.984	651046.747	1125569.290	25.180

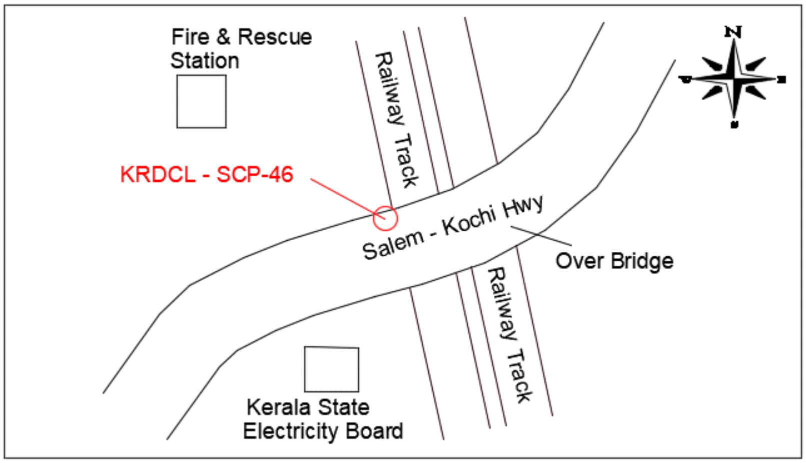
DESCRIPTION	The survey station, KRDCL-046-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Salem-Kochi road. The survey station is near by fire and rescue station. It is approximately 2 metres away from the ofc stone.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





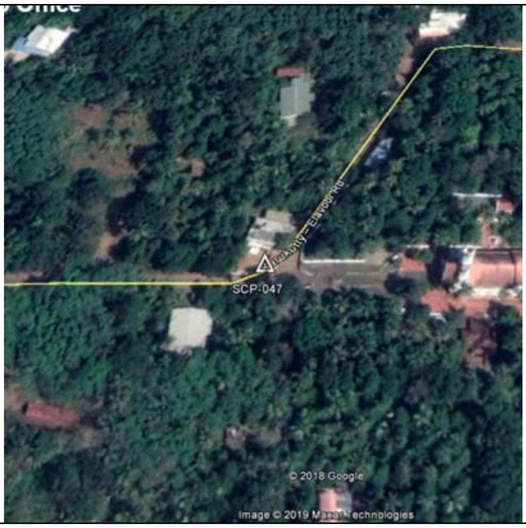
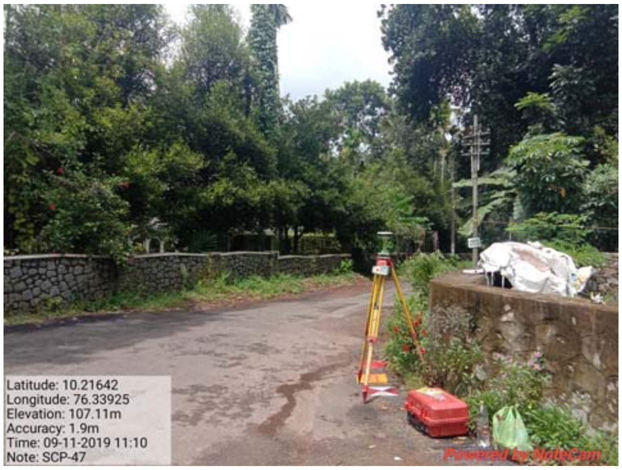
DGPS SURVEY REPORT

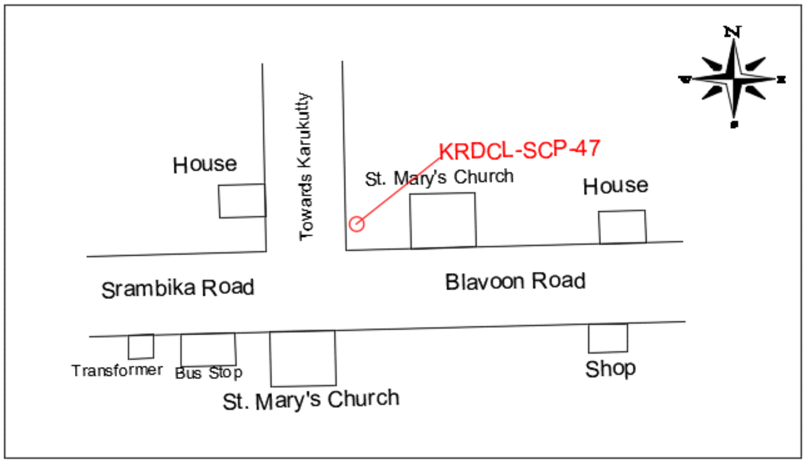
CLIENT	CONSULTANT	SURVEYED BY	DATE : 11/9/2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-047-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
10° 12' 59.02808" N	76° 20' 21.00824" E	-82.525	646681.356	1129642.308	13.471

DESCRIPTION	The survey station, KRDCL-047-SCP is marked with red and white paint and nail point on the top of the Karakutty-Elavoor BT road. The survey station is near by saint marys catholic church,kuviyakkulam village. It is approximately 8 metres away from the telephone pole.

LOCATION ON GOOGLE MAP	**FIELD PHOTOGRAPH**
 Karakutty - Elavoor Rd SCP-047 © 2018 Google Image © 2019 Maxar Technologies	 Latitude: 10.21642 Longitude: 76.33925 Elevation: 107.11m Accuracy: 1.9m Time: 09-11-2019 11:10 Note: SCP-47



DGPS SURVEY REPORT

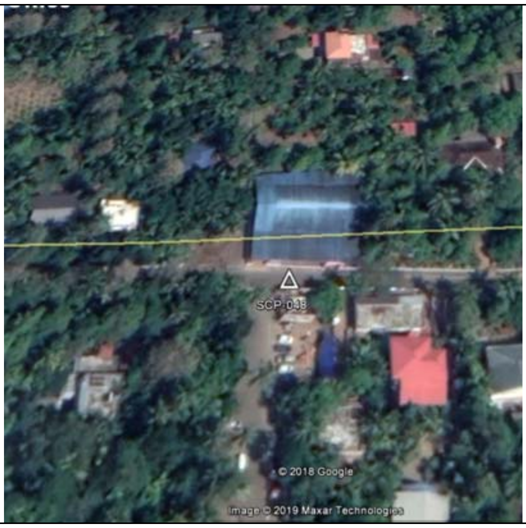
CLIENT	CONSULTANT	SURVEYED BY	DATE : 11/9/2019
			DGPS POINT ID
			KRDCL-048-SCP/TCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

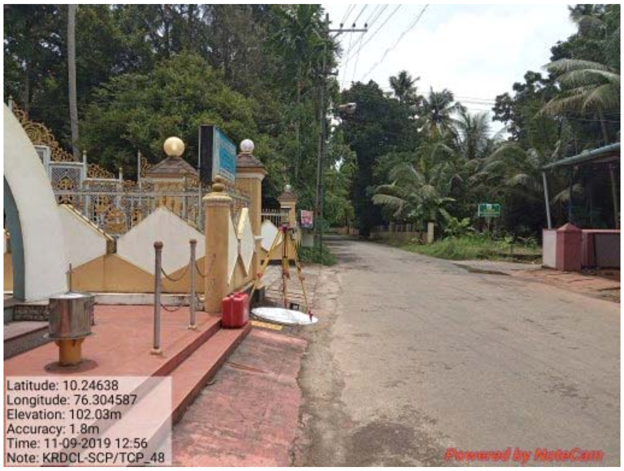
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
10° 14' 46.90181" N	76° 18' 16.28319" E	-88.255	642872.509	1132940.658	7.759

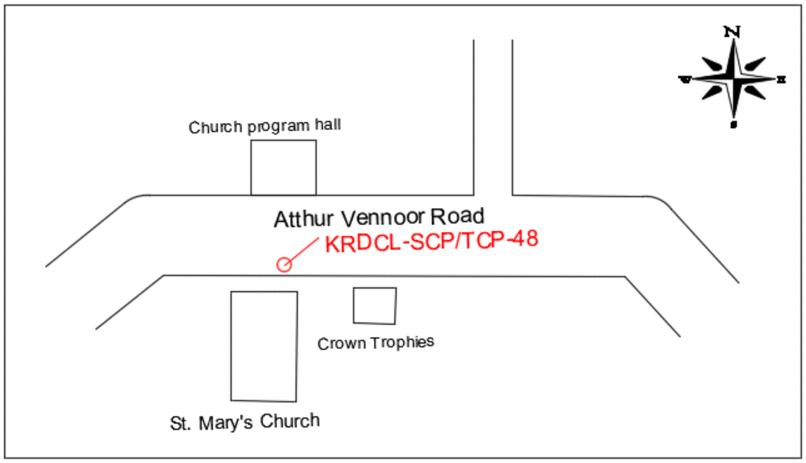
DESCRIPTION	The survey station, KRDCL-048-SCP/TCP is marked with white circular paint and nail point on the top of the Alathur-vannoor BT road. The survey station is near by saint mary's church,vannoor village. It is approximately 5 metres away from the church program hall.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





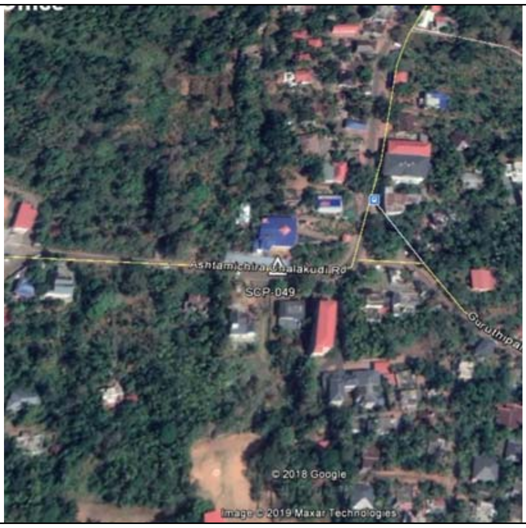
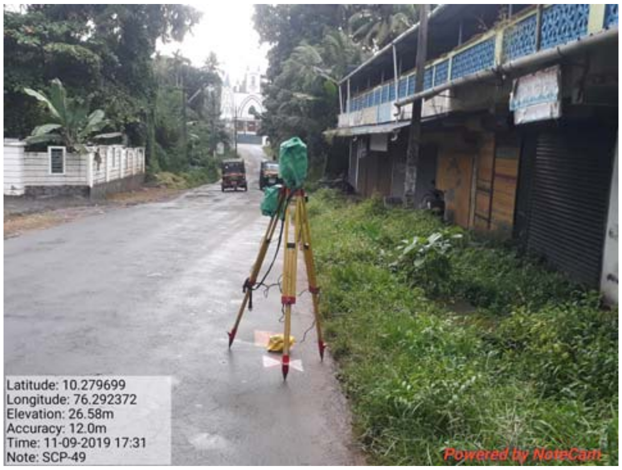
DGPS SURVEY REPORT

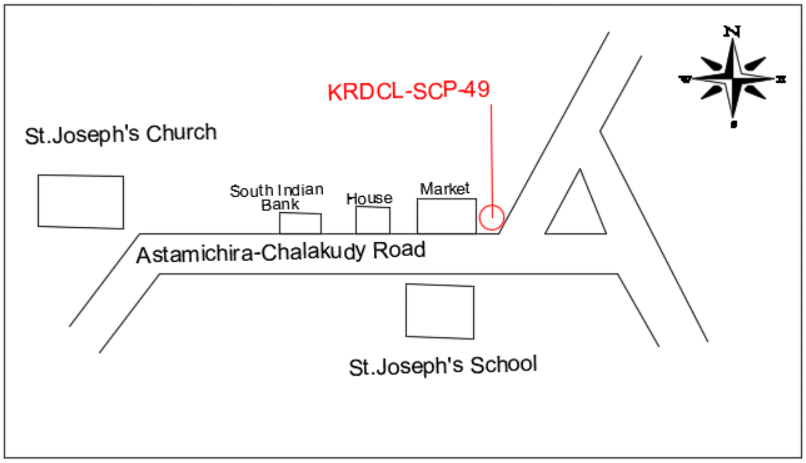
CLIENT	CONSULTANT	SURVEYED BY	DATE : 11/9/2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID
			KRDCL-049-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
10° 16' 46.88300" N	76° 17' 32.39052" E	-75.470	641522.156	1136621.089	20.482

DESCRIPTION	The survey station, KRDCL-049-SCP is marked with red and white paint and nail point on the top of the Astamichira-Challkudy BT road. The survey station is near by saint joseph school. It is approximately 5 metres away from the electric pole.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
 Ashtamichira-Chalakudi Rd SCP-049 Guruthipal © 2018 Google Image © 2019 Maxar Technologies	 Latitude: 10.279699 Longitude: 76.292372 Elevation: 26.58m Accuracy: 12.0m Time: 11-09-2019 17:31 Note: SCP-49 Powered by NoteCam



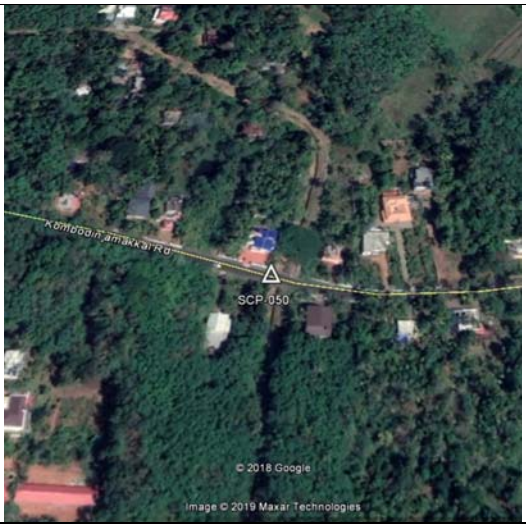
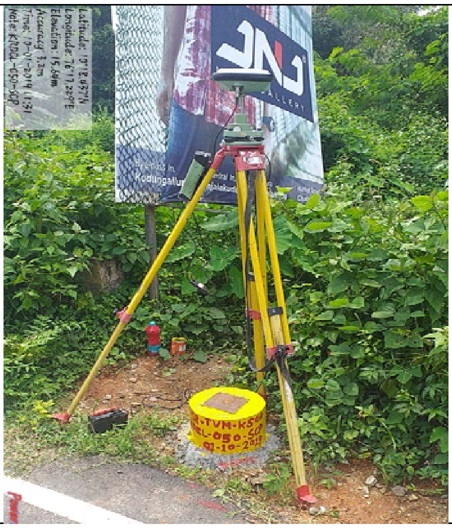
DGPS SURVEY REPORT

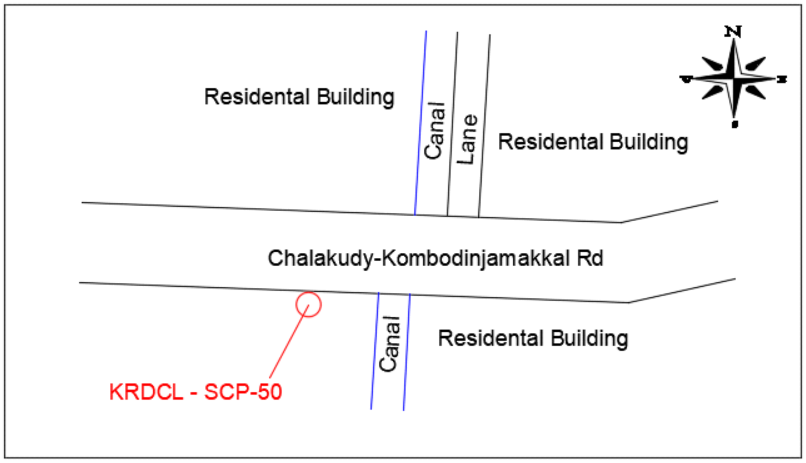
CLIENT	CONSULTANT	SURVEYED BY	DATE : 1/10/2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-050-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
10° 18' 25.96677" N	76° 17' 13.72049" E	-73.672	640941.917	1139662.655	22.313

DESCRIPTION	The survey station, KRDCL-050-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Chalakudy-Komodinamakkal road. The survey station is near by residential building,chalakudy village. It is approximately 2 metres away from the canal.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	



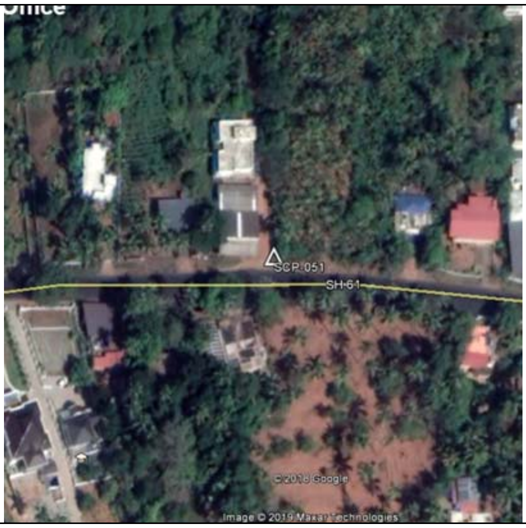
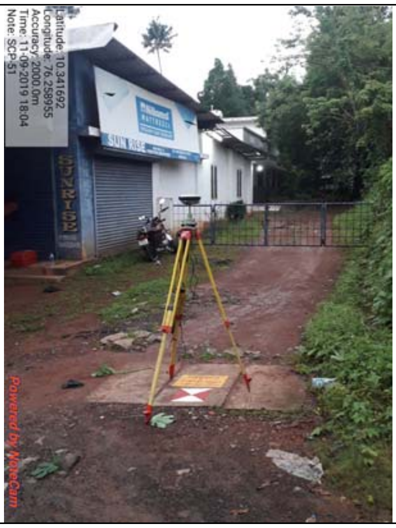
DGPS SURVEY REPORT

CLIENT	CONSULTANT	SURVEYED BY	DATE : 11/9/2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID
			KRDCL-051-SCP

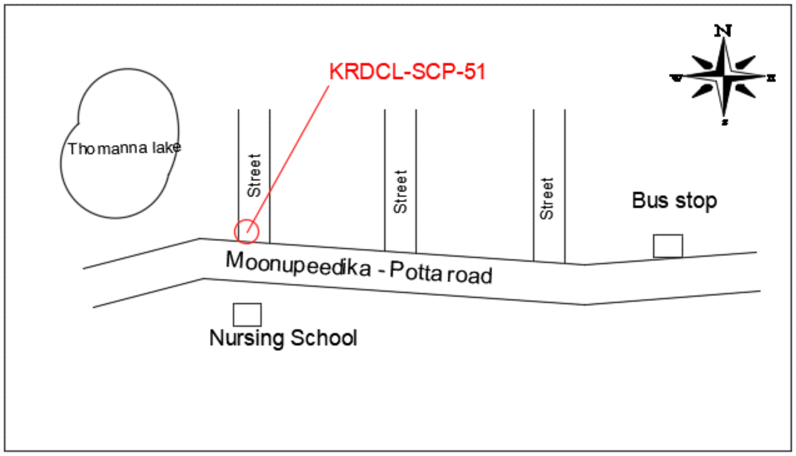
PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
10° 20' 32.83664" N	76° 15' 31.04246" E	-84.207	637802.977	1143547.638	11.685

DESCRIPTION	The survey station, KRDCL-051-SCP is marked with red and white paint and nail point on the top of the concrete slab on the side of the Moonupedika-Potta BT road. The survey station is near by thommana lake. It is approximately 2 metres away from the sunrise saw mill shop.

LOCATION ON GOOGLE MAP	**FIELD PHOTOGRAPH**
	

Latitude: 10.341692
Longitude: 76.258955
Accuracy: 20000.0m
Time: 11-09-2019 18:04
Note: SCP-51



DGPS SURVEY REPORT

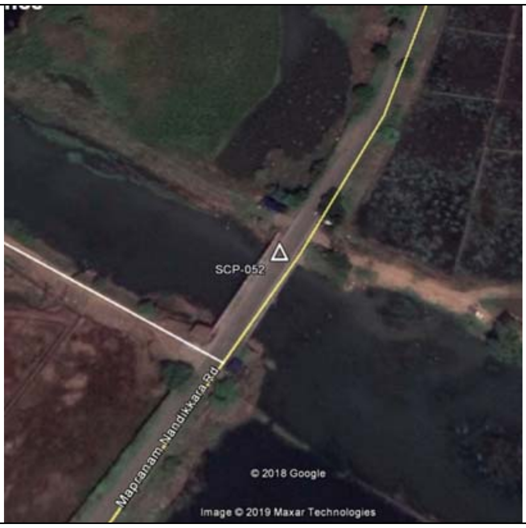
CLIENT	CONSULTANT	SURVEYED BY	DATE : 11/9/2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID
			KRDCL-052-SCP

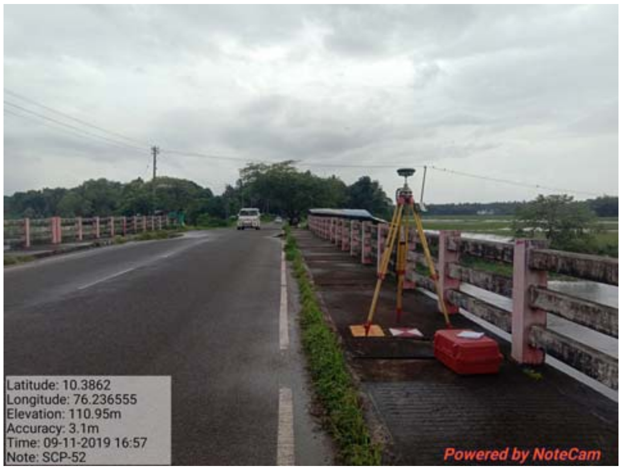
PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

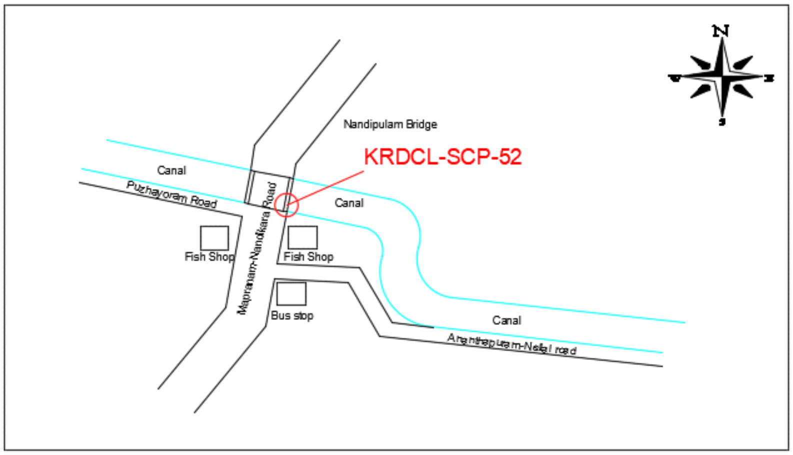
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
10° 23' 10.27888" N	76° 14' 11.53301" E	-89.118	635365.711	1148374.731	6.729

DESCRIPTION	The survey station, KRDCL-052-SCP is marked with red and white paint and nail point on the top of the bridge of the Mapparnam-Nandhikara BT road. The bridge is across the muriyad-moor canal. It is approximately 50 metres away from the electric pole.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH







DGPS SURVEY REPORT

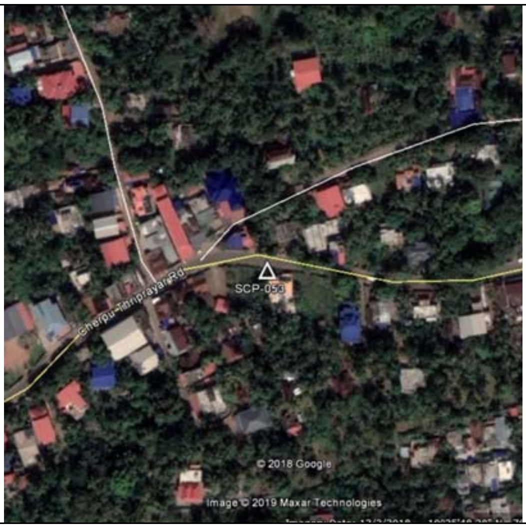
CLIENT	CONSULTANT	SURVEYED BY	DATE : 12/9/2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-053-SCP/TCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

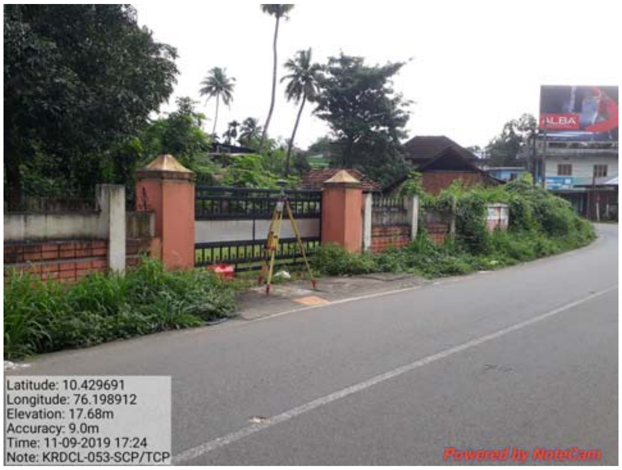
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
10° 25' 46.80267" N	76° 11' 55.76643" E	-89.072	631218.460	1153167.191	6.630

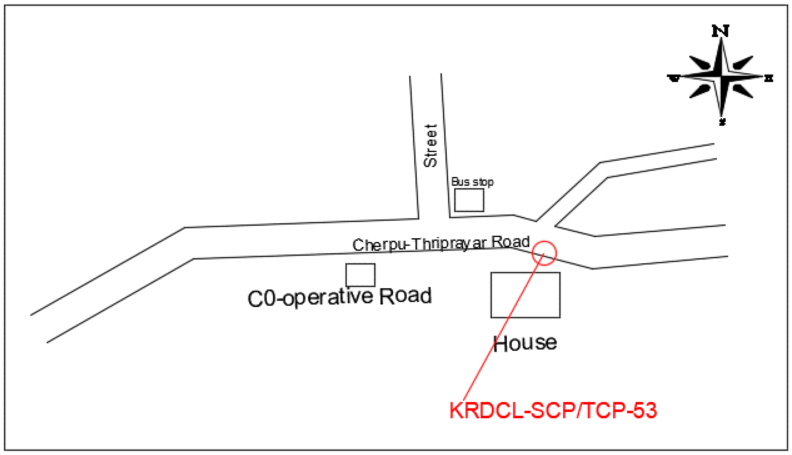
DESCRIPTION	The survey station, KRDCL-053-SCP/TCP is marked with white circular paint and nail point on the top of the Cherpu- Thriprayar BT road. The survey station is near by co-operative bank,cherpu village. It is approximately 30 metres away from the padinattamuri bus stop.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





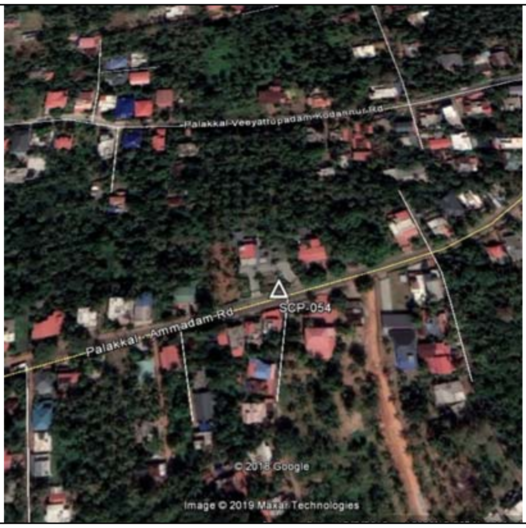
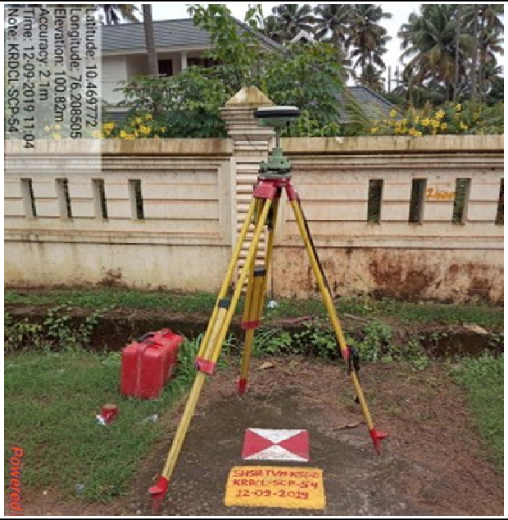
DGPS SURVEY REPORT

CLIENT	CONSULTANT	SURVEYED BY	DATE : 12/9/2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-054-SCP

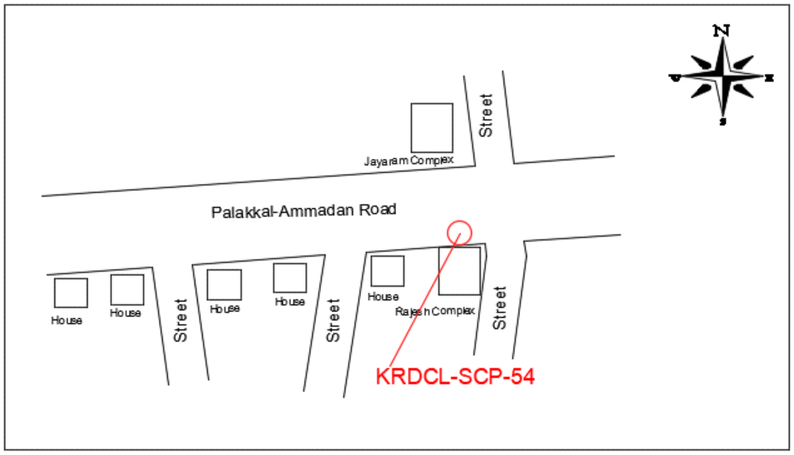
PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
10° 28' 11.28753" N	76° 12' 30.46751" E	-79.938	632256.692	1157609.687	15.740

DESCRIPTION	The survey station, KRDCL-054-SCP is marked with red and white paint and nail point on the top of the Pallakal-Ammadan BT road. The survey station is near by residential building,venginissery village. It is approximately 30 metres away from the rajesh complex.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	

Palakkal-Veeyattropadam-Kodannur-Rd
Palakkal-Ammadam-Rd
SCP-054
© 2018 Google
Image © 2019 Maxar Technologies



DGPS SURVEY REPORT

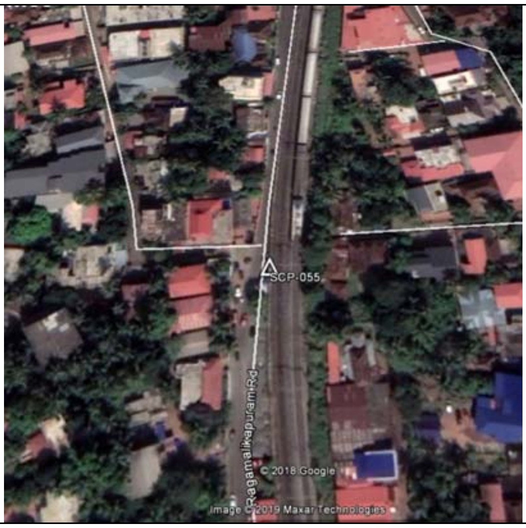
CLIENT	CONSULTANT	SURVEYED BY	DATE : 1/10/2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID
			KRDCL-055-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

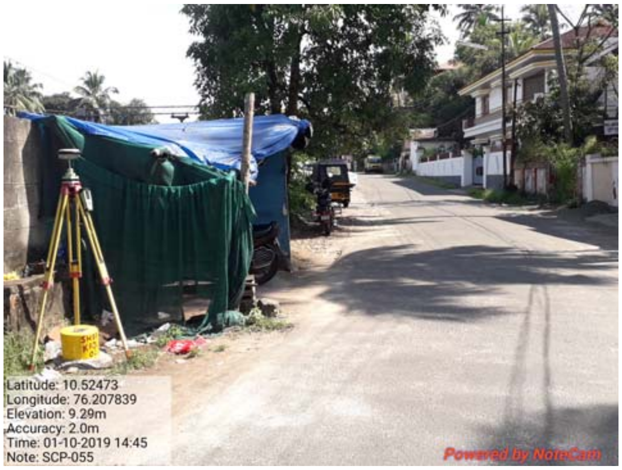
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
10° 31' 28.84681" N	76° 12' 28.28800" E	-82.834	632167.112	1163678.344	12.749

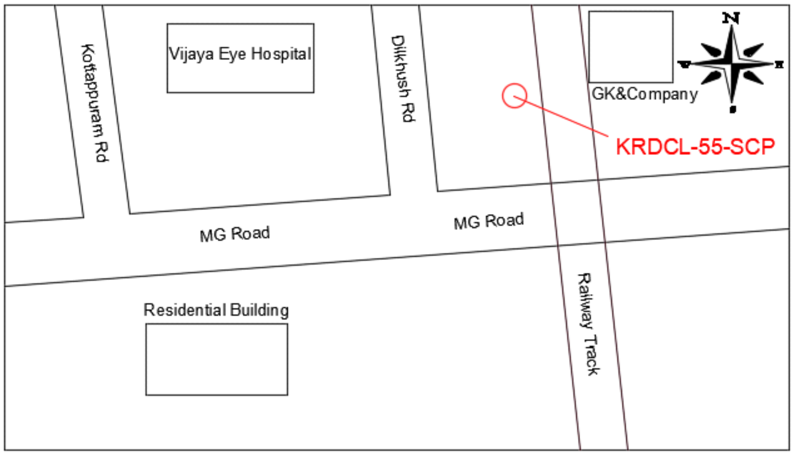
DESCRIPTION	The survey station, KRDCL-055-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Dilkush road. The survey station is near by railway overbridge . It is approximately 15 metres away from the vijayasree eye hospital.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





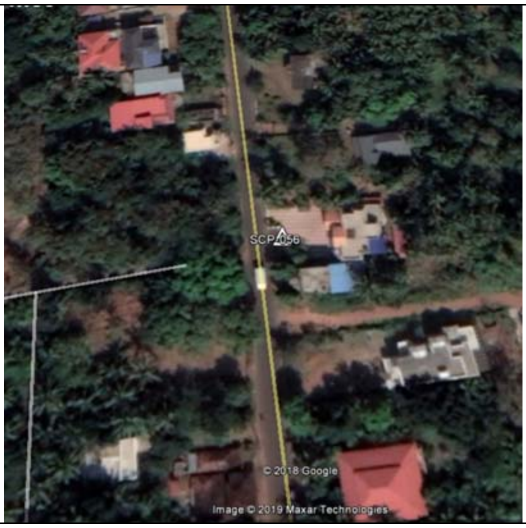
DGPS SURVEY REPORT

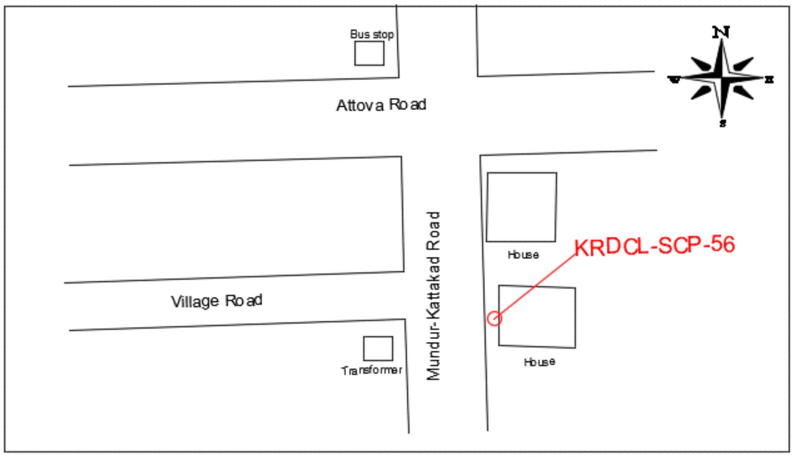
CLIENT	CONSULTANT	SURVEYED BY	DATE : 12/9/2019
			DGPS POINT ID
			KRDCL-056-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
10° 34' 19.88089" N	76° 11' 33.46511" E	-82.892	630480.507	1168926.026	12.564

DESCRIPTION	The survey station, KRDCL-056-SCP is marked with red and white paint and nail point on the top of the Mundur-Kottakad BT road. The survey station is near by K.A.lisson kolengadam house,kottekkad village. It is approximately 5 metres away from the telephone box.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	Latitude: 10.572253 Longitude: 76.192548 Elevation: 96.48m Accuracy: 2.5m Time: 09-12-2019 10:23 Note: SCP-56 Powered by NoteCam



DGPS SURVEY REPORT

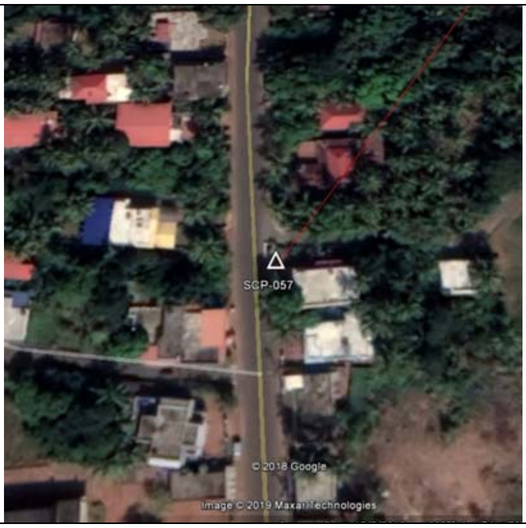
CLIENT	CONSULTANT	SURVEYED BY	DATE : 12/9/2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-057-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

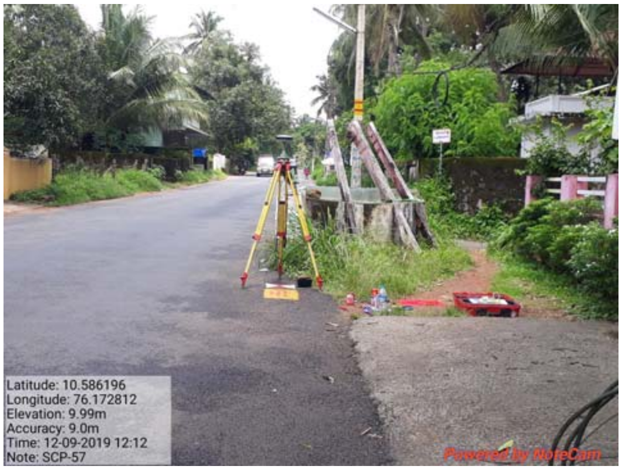
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
10° 35' 10.55074" N	76° 10' 22.09677" E	-84.212	628305.451	1170474.348	11.179

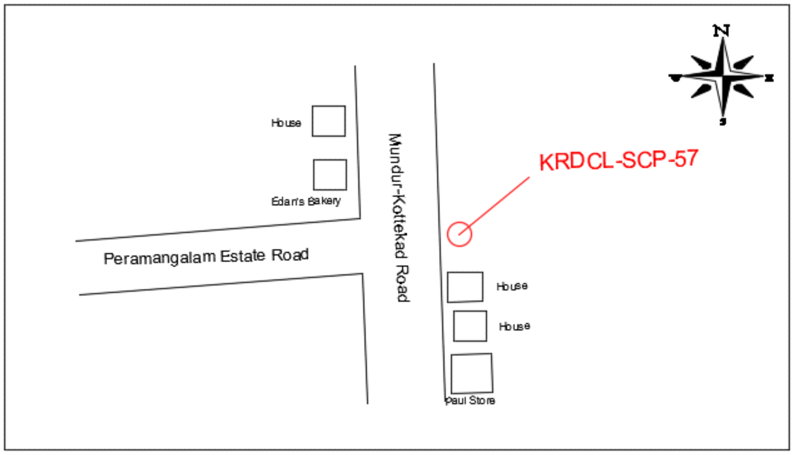
DESCRIPTION	The survey station, KRDCL-057-SCP is marked with red and white paint and nail point on the top of the Mundur-Kottakad BT road. The survey station is near by edhan's bakery,mudur-kottekkad road. It is approximately 2 metres away from the well.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





DGPS SURVEY REPORT

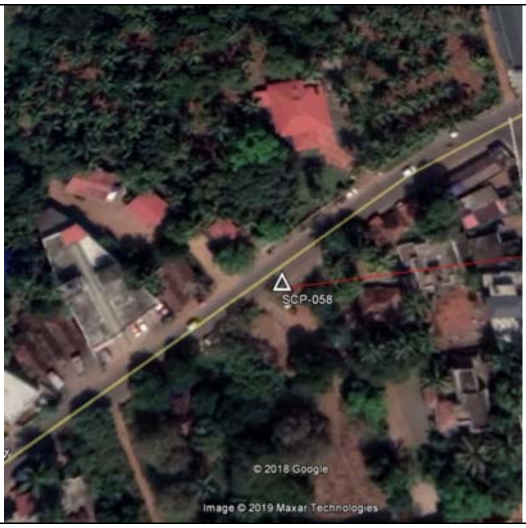
CLIENT	CONSULTANT	SURVEYED BY	DATE : 12/9/2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-058-SCP/TCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

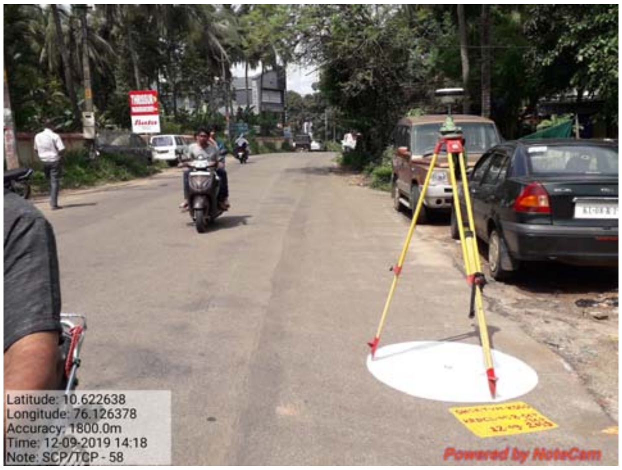
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
10° 37' 20.59949" N	76° 07' 34.68175" E	-68.588	623202.789	1174450.533	26.616

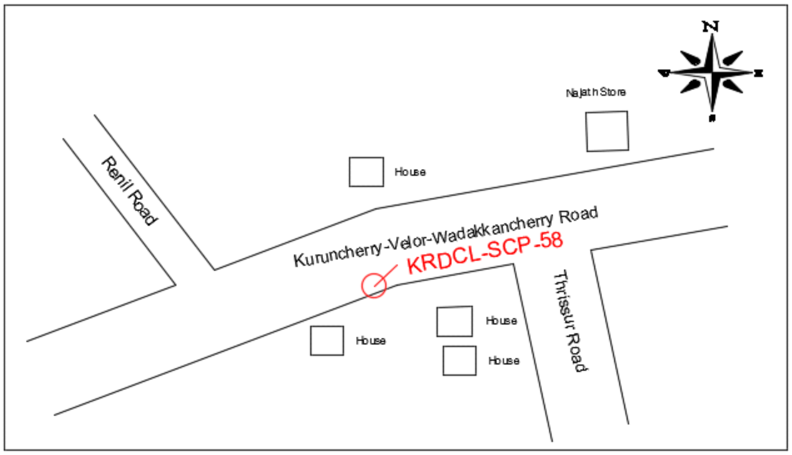
DESCRIPTION	The survey station, KRDCL-058-SCP/TCP is marked with white circular paint and nail point on the top of the wadakkancherry-kurancherry-velor BT road. The survey station is near by vazhanai canal. It is approximately 40 metres away from the najith stores.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





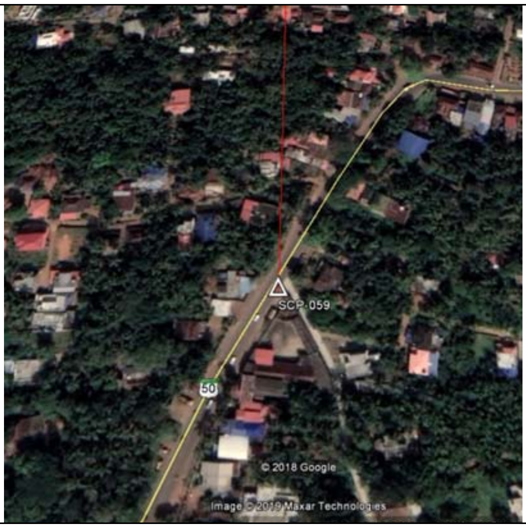
DGPS SURVEY REPORT

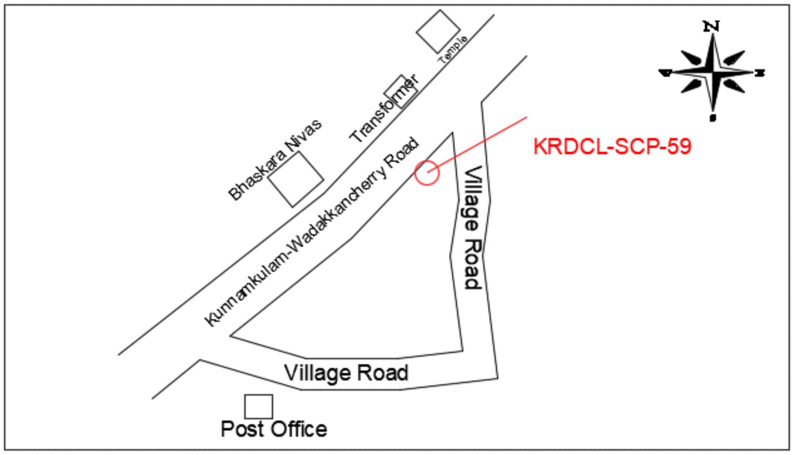
CLIENT	CONSULTANT	SURVEYED BY	DATE : 12/9/2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-059-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
10° 39' 30.73437" N	76° 05' 08.00441" E	-79.195	618731.455	1178432.217	15.842

DESCRIPTION	The survey station, KRDCL-059-SCP is marked with red and white paint and nail point on the top of the Kunnamkulam-Wadakkancherry BT road. The survey station is near by bhaskara nivas house,chowannur. It is approximately 5 metres away from the electric pole.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
 SCP-059 50 © 2018 Google Image © 2019 Maxar Technologies	Latitude: 10.658458 Longitude: 76.085562 Elevation: 104.59m Accuracy: 2.5m Time: 09-12-2019 16:11 Note: SCP-59 Powered by NoteCam



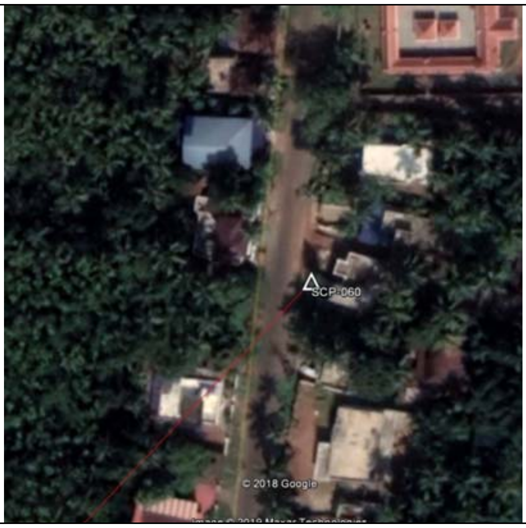
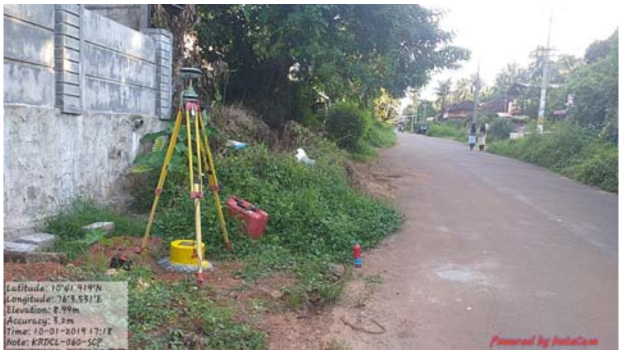
DGPS SURVEY REPORT

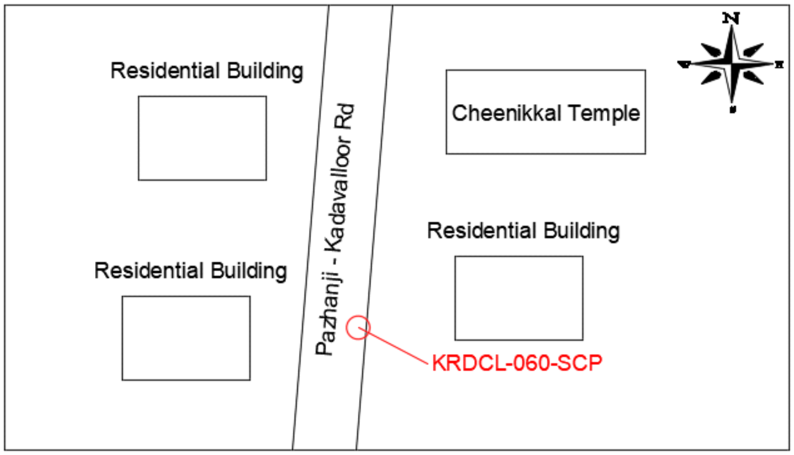
CLIENT	CONSULTANT	SURVEYED BY	DATE : 1/10/2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID
			KRDCL-060-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
10° 41' 55.05347" N	76° 03' 31.87989" E	-84.420	615795.538	1182855.343	10.505

DESCRIPTION	The survey station, KRDCL-060-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Pazhanji-Kadavallor road. The survey station is near by cheenikkal ayyappa temple,aynoor village. It is approximately 8 metres away from the electric pole.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	 Latitude: 10°41.919'N Longitude: 76°3.531'E Elevation: 8.99m Accuracy: 3.2m Time: 10-01-2019 17:18 Note: KRDCL-060-SCP Powered by NoteCam



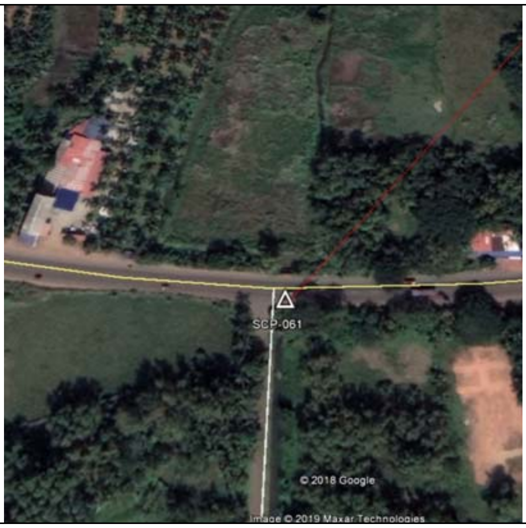
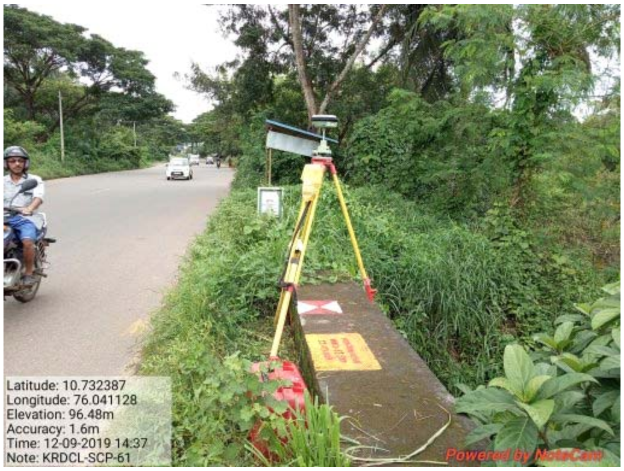
DGPS SURVEY REPORT

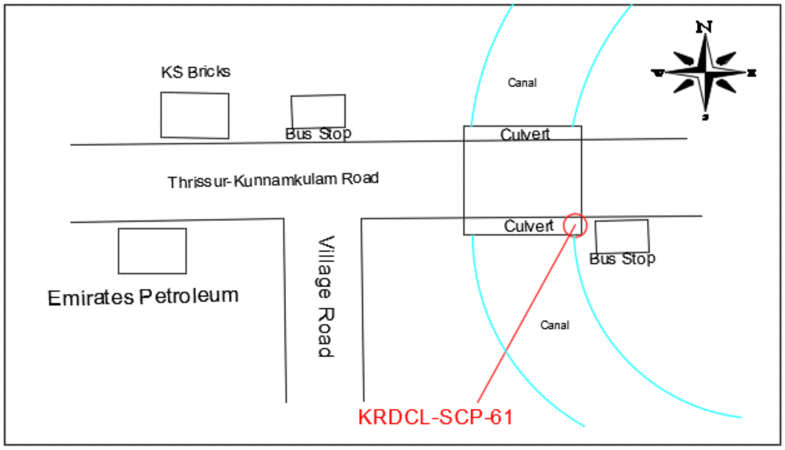
CLIENT	CONSULTANT	SURVEYED BY	DATE : 12/9/2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-061-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
10° 43' 56.61563" N	76° 02' 28.09837" E	-89.863	613845.193	1186582.922	4.982

DESCRIPTION	The survey station, KRDCL-061-SCP is marked with red and white paint and nail point on the top of the culvert on the side of the Kunnamkulam-Thrissur BT road. The survey station is near by emirates petroleum. It is approximately 10 metres away from the bus stop.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	 Latitude: 10.732387 Longitude: 76.041128 Elevation: 96.48m Accuracy: 1.6m Time: 12-09-2019 14:37 Note: KRDCL-SCP-61 Powered by NoteCam



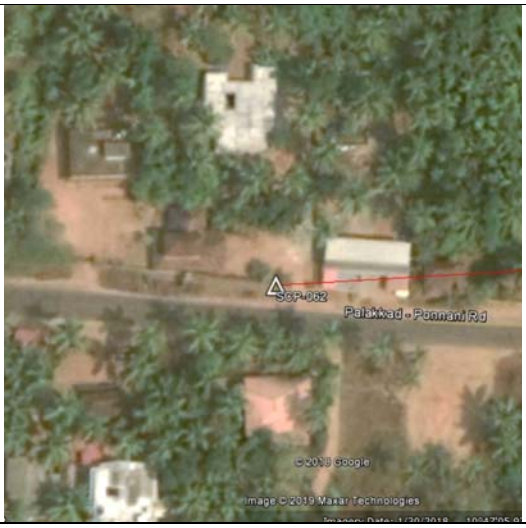
DGPS SURVEY REPORT

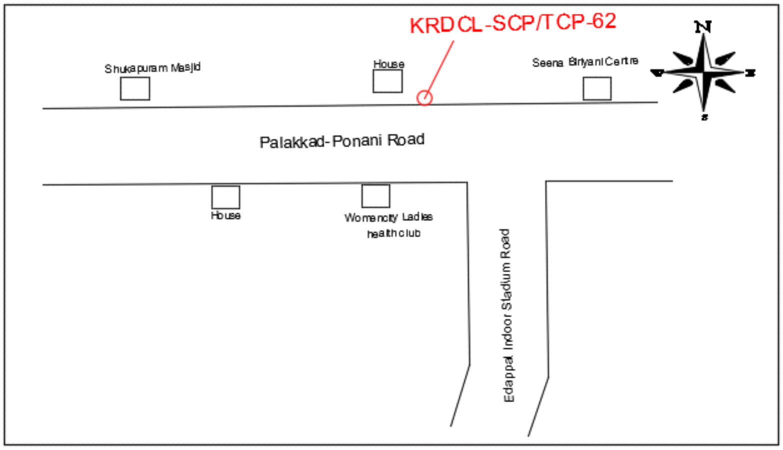
CLIENT	CONSULTANT	SURVEYED BY	DATE : 12/9/2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-062-SCP/TCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
10° 47' 05.90443" N	76° 01' 00.82294" E	-85.317	611174.749	1192388.640	9.426

DESCRIPTION	The survey station, KRDCL-062-SCP/TCP is marked with white circular paint and nail point on the top of the Palakkad-Ponnai BT road. The survey station is near by seena biryani center. It is approximately 5 metres away from the women city ladies club.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
 SCP-062 Palakkad - Ponnani Rd © 2018 Google Image © 2019 Maxar Technologies Imagery Date: 1/30/2018	Latitude: 10.78497 Longitude: 76.016862 Elevation: 16.22m Accuracy: 14.0m Time: 12-09-2019 16:56 Note: SCP-TCP-62 12-09-2019 Powered



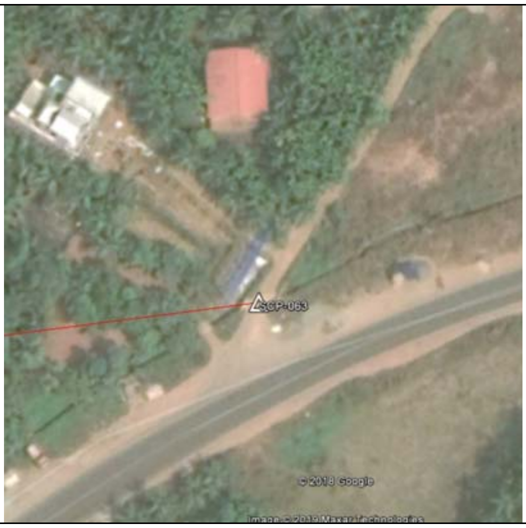
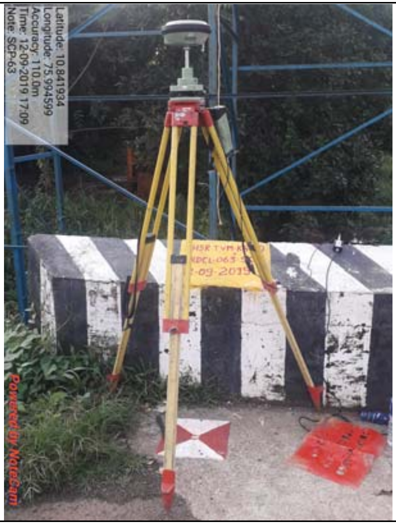
DGPS SURVEY REPORT

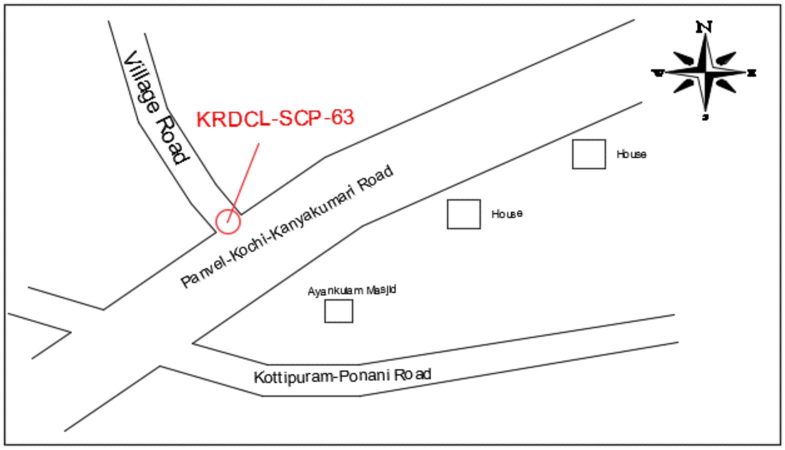
CLIENT	CONSULTANT	SURVEYED BY	DATE : 12/9/2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID
			KRDCL-063-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
10° 50' 32.06577" N	75° 59' 42.03098" E	-84.911	608761.069	1198713.637	9.625

DESCRIPTION	The survey station, KRDCL-063-SCP is marked with red and white paint and nail point on the top of the culvert on the Panavel-Kochi-Kanniyakumari BT road. The survey station is near by panvel kochi kanyakumari highway name board. It is approximately 10 metres away from the tea shop.

LOCATION ON GOOGLE MAP	**FIELD PHOTOGRAPH**
	 Latitude: 10.841934 Longitude: 75.994599 Accuracy: 110.0m Time: 12-09-2019 17:09 Note: SCP-63 Powered by NoteCam



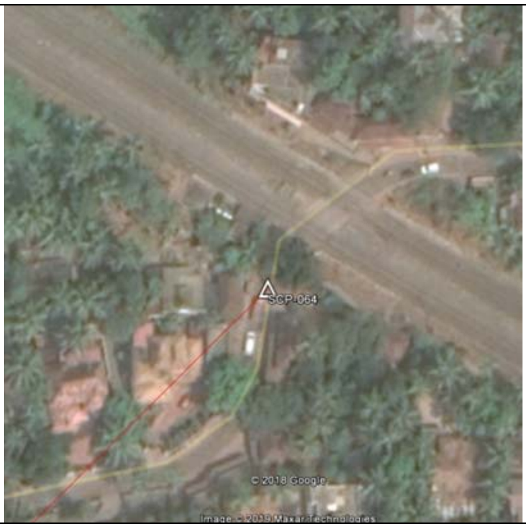
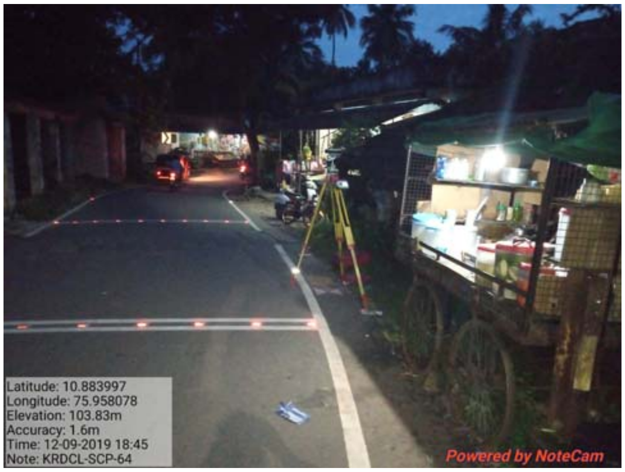
DGPS SURVEY REPORT

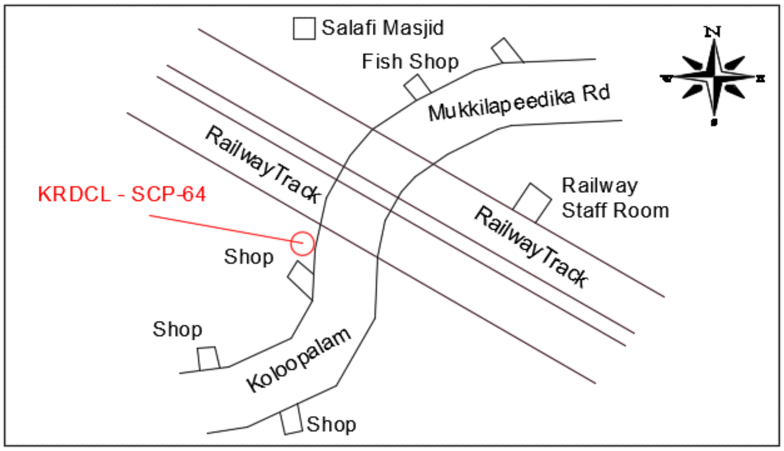
CLIENT	CONSULTANT	SURVEYED BY	DATE : 12/9/2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-064-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
10° 53' 02.11983" N	75° 57' 29.10603" E	-84.478	604710.188	1203310.020	9.837

DESCRIPTION	The survey station, KRDCL-064-SCP is marked with red and white paint and nail point on the top of the Koloopalam-Mukkulapedika BT road. The survey station is near by railway track. It is approximately 10 metres away from the fish shop.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	



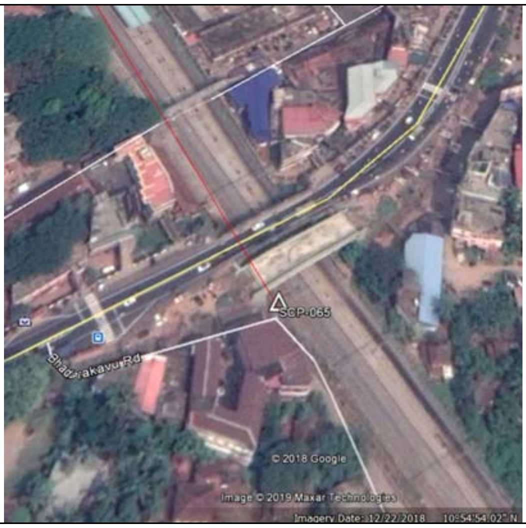
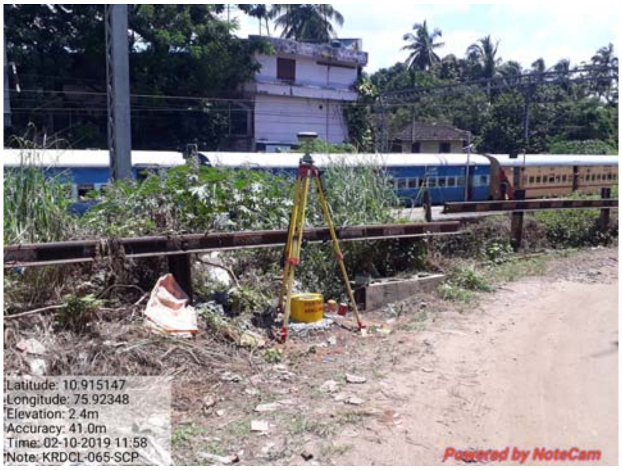
DGPS SURVEY REPORT

CLIENT	CONSULTANT	SURVEYED BY	DATE : 2/10/2019
			DGPS POINT ID
			KRDCL-065-SCP

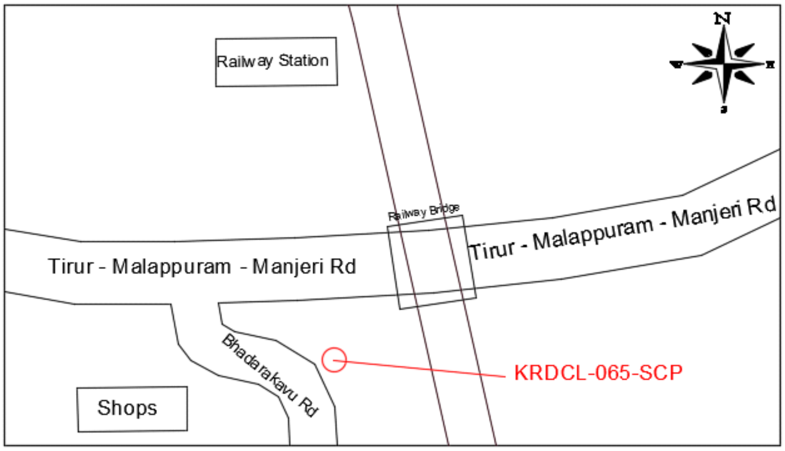
PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
10° 54' 54.27208" N	75° 55' 25.00174" E	-85.049	600931.737	1206743.378	9.130

DESCRIPTION	The survey station, KRDCL-065-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Tirur-Malapuram road.. The survey station is near by new light electrical and CV metals. It is approximately 15 metres away from the railway track.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	

SCP-065
Bhadarakavu Rd
© 2018 Google
Image © 2019 Maxar Technologies
Imagery Date: 12/22/2018 10°54'54.02" N



DGPS SURVEY REPORT

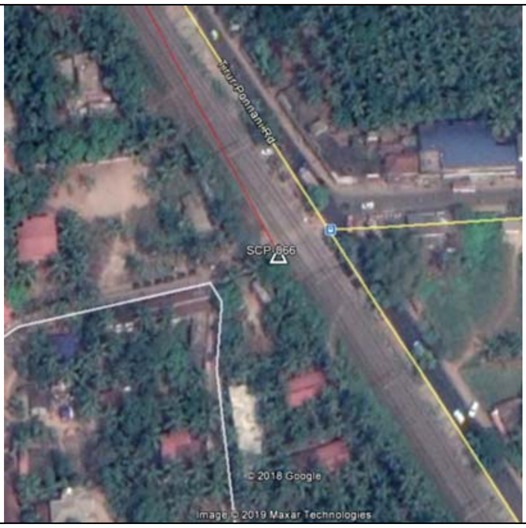
CLIENT	CONSULTANT	SURVEYED BY	DATE : 12/9/2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-066-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

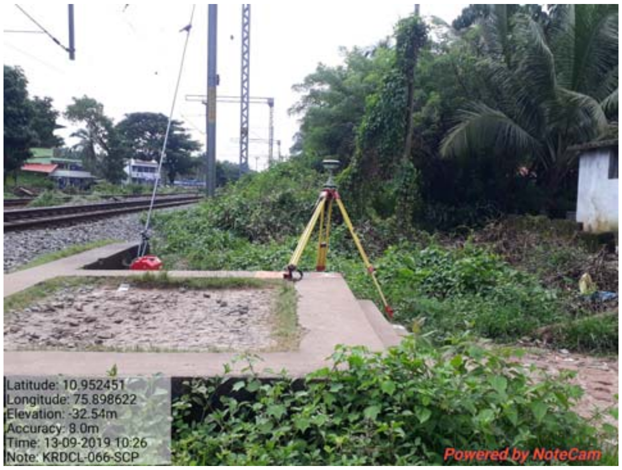
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
10° 57' 08.37703" N	75° 53' 55.43890" E	-83.851	598200.554	1210854.548	10.111

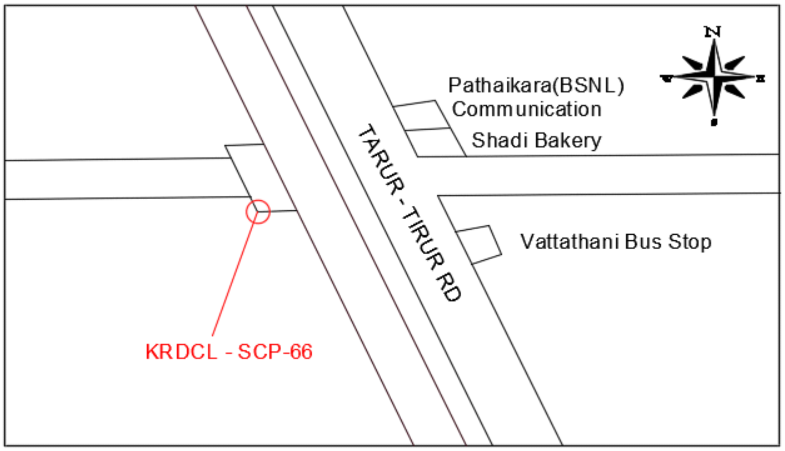
DESCRIPTION	The survey station, KRDCL-066-SCP is marked with red and white paint and nail point on the top of the railway footpath and is on the side of the Tharur-Thirur BT road. The survey station is near by vattathani bus stop. It is approximately 42 metres away from the shadi bakery.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





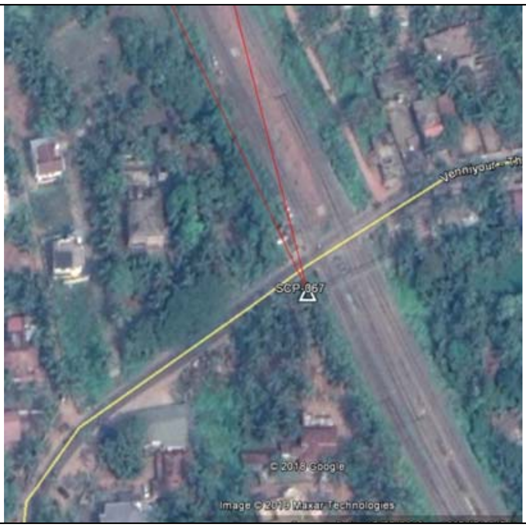
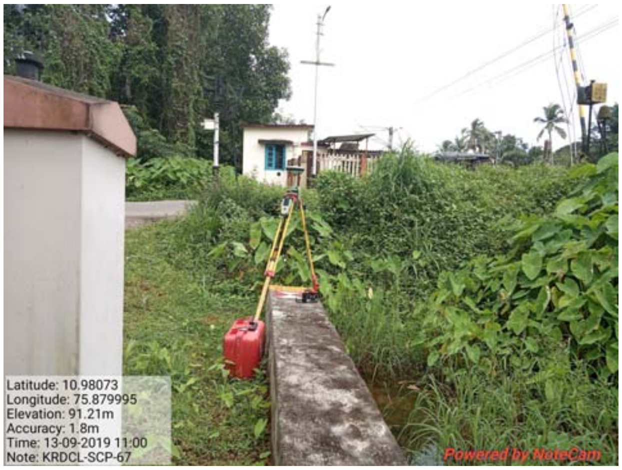
DGPS SURVEY REPORT

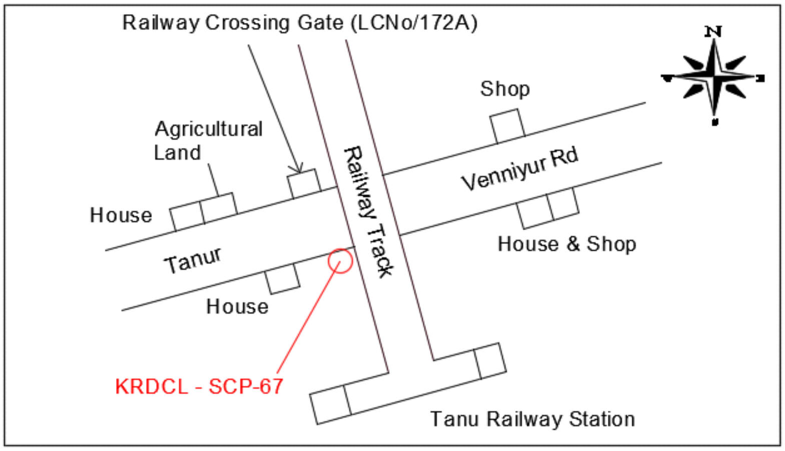
CLIENT	CONSULTANT	SURVEYED BY	DATE : 13-09-2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-067-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
10° 58' 50.75562" N	75° 52' 47.99522" E	-86.988	596144.193	1213993.307	6.817

DESCRIPTION	The survey station, KRDCL-067-SCP is marked with red and white paint and nail point on the top of culvert on the side of the Tanur-Velliyur BT road. The survey station is near by railway track. It is approximately 120 metres away from the agricultural land.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	



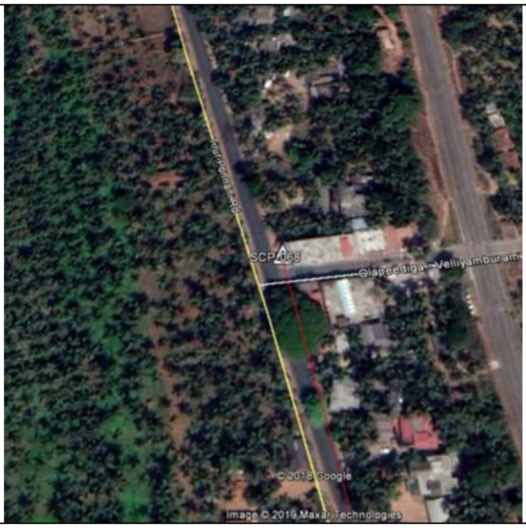
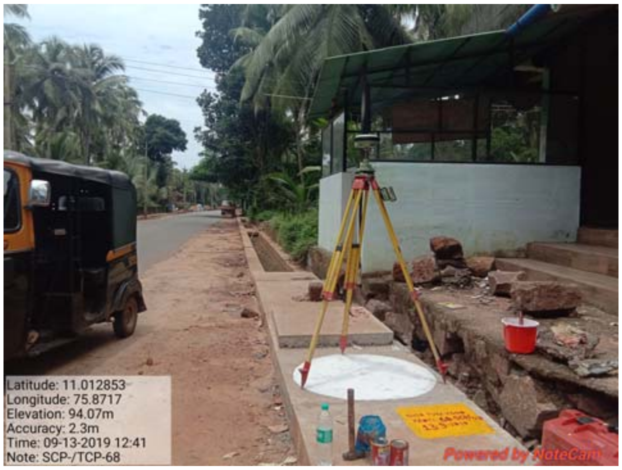
DGPS SURVEY REPORT

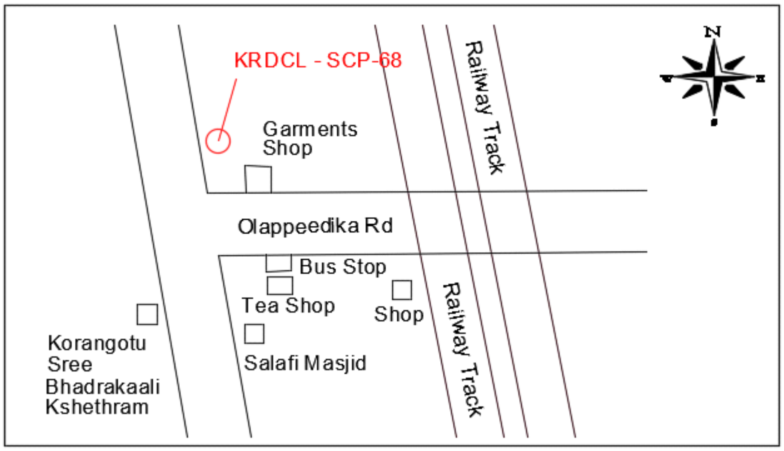
CLIENT	CONSULTANT	SURVEYED BY	DATE : 13-09-2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-068-SCP/TCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
11° 00' 46.23612" N	75° 52' 17.86972" E	-84.640	595219.566	1217537.897	9.056

DESCRIPTION	The survey station, KRDCL-068-SCP/TCP is marked with white circular paint and nail point on the top of the concrete slab covering a drainage on the side of the Thirur-Kadalundi BT road. The survey station is near by konangotu sree bhadrakali temple. It is approximately 5 metres away from the garments shop.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	



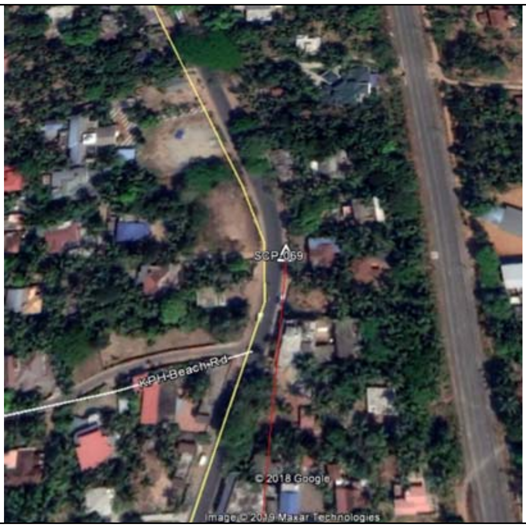
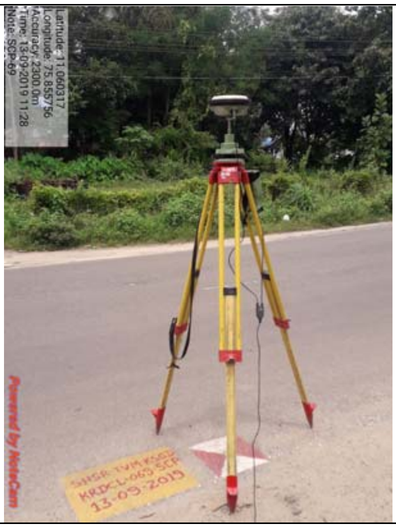
DGPS SURVEY REPORT

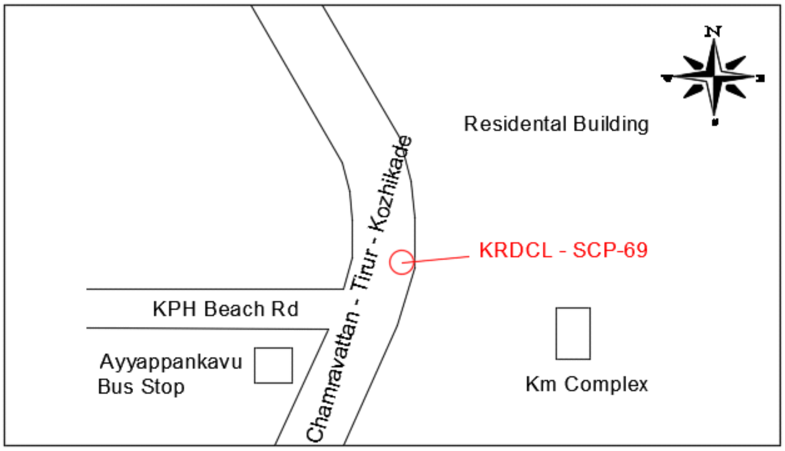
CLIENT	CONSULTANT	SURVEYED BY	DATE : 13-09-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID
			KRDCL-069-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
11° 03' 31.71047" N	75° 51' 20.43083" E	-84.949	593461.912	1222615.801	8.596

DESCRIPTION	The survey station, KRDCL-069-SCP is marked with red and white paint and nail point on the top of the Chamaravattan-Thirur-Kozhikode BT road. The survey station is near by KM complex. It is approximately 50 metres away from the ayyappankavu bus stop.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
 SCP-69 KPH Beach Rd © 2018 Google Image © 2019 Maxar Technologies	 Latitude: 11.060317 Longitude: 75.855756 Accuracy: 2300.0m Time: 13-09-2019 11:28 Note: SCP-69 Powered by NoteCam KRDCL-069-SCP 13-09-2019



DGPS SURVEY REPORT

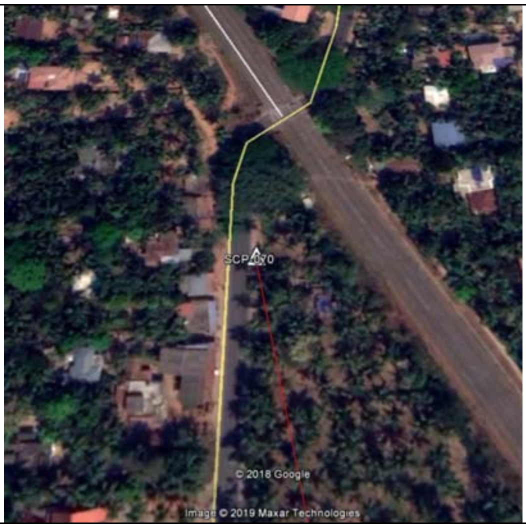
CLIENT	CONSULTANT	SURVEYED BY	DATE : 13-09-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-070-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

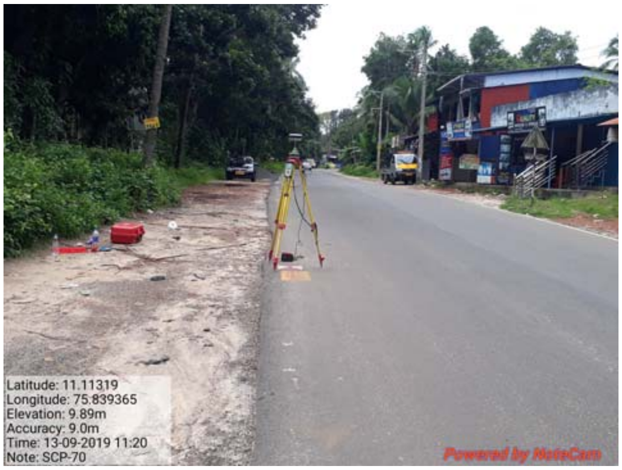
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
11° 06' 47.30173" N	75° 50' 21.70291" E	-85.745	591663.030	1228618.773	7.565

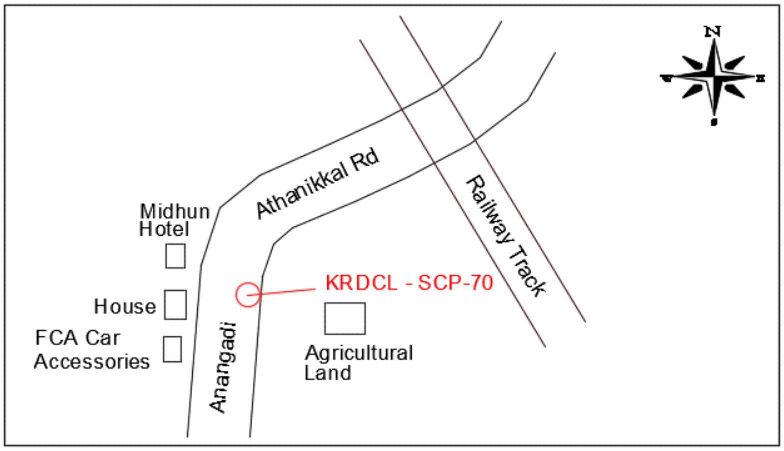
DESCRIPTION	The survey station, KRDCL-070-SCP is marked with red and white paint and nail point on the top of the Annangadi-Athanikal BT road. The survey station is near by railway track. It is approximately 45 metres away from the fcacar accpssories shop and midsom hotel.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





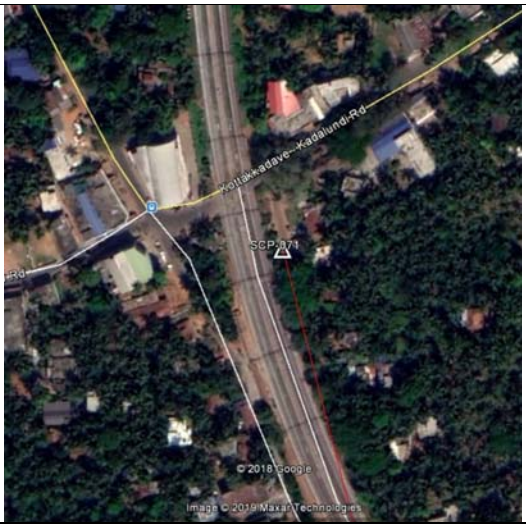
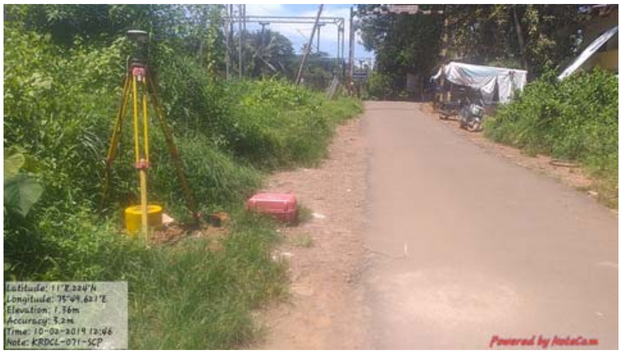
DGPS SURVEY REPORT

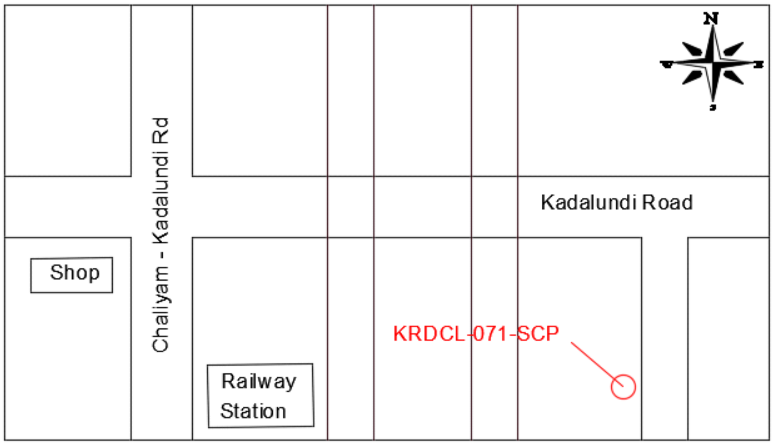
CLIENT	CONSULTANT	SURVEYED BY	DATE : 2/10/2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-071-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
11° 08' 13.56771" N	75° 49' 37.15458" E	-89.936	590304.193	1231264.839	3.266

DESCRIPTION	The survey station, KRDCL-071-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Kadalundi road.. The survey station is near by railway crossing. It is approximately 15 metres away from the tea shop.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	



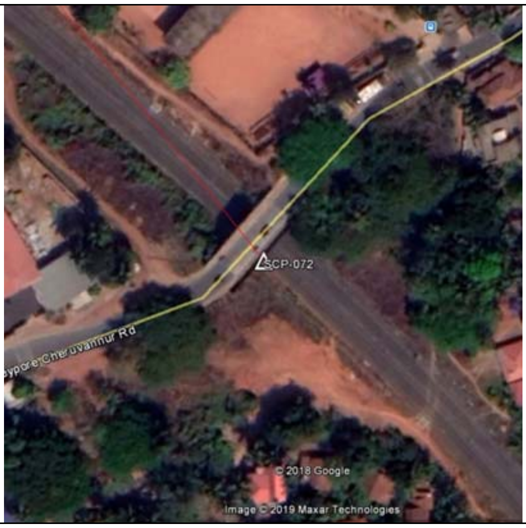
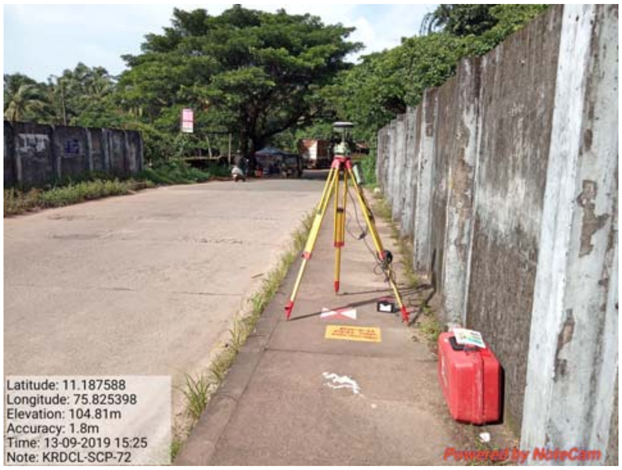
DGPS SURVEY REPORT

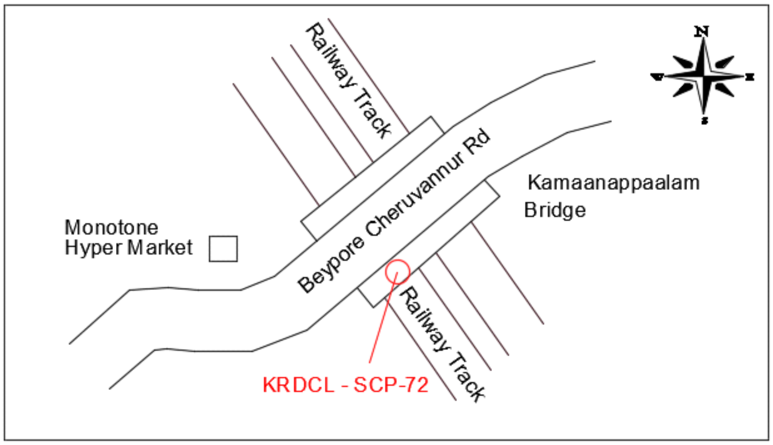
CLIENT	CONSULTANT	SURVEYED BY	DATE : 13-09-2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-072-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
11° 11' 15.52180" N	75° 49' 31.38006" E	-77.969	590113.439	1236853.492	15.081

DESCRIPTION	The survey station, KRDCL-072-SCP is marked with red and white paint and nail point on the top of the bridge of the Beypore-Cheruvannur BT road . The bridge goes over a railway track. It is approximately 50 metres away from the monotone hyper market.

LOCATION ON GOOGLE MAP	**FIELD PHOTOGRAPH**
 SCP-072 eypore-Cheruvannur Rd © 2018 Google Image © 2019 Maxar Technologies	 Latitude: 11.187588 Longitude: 75.825398 Elevation: 104.81m Accuracy: 1.8m Time: 13-09-2019 15:25 Note: KRDCL-SCP-72 Powered by NoteCam



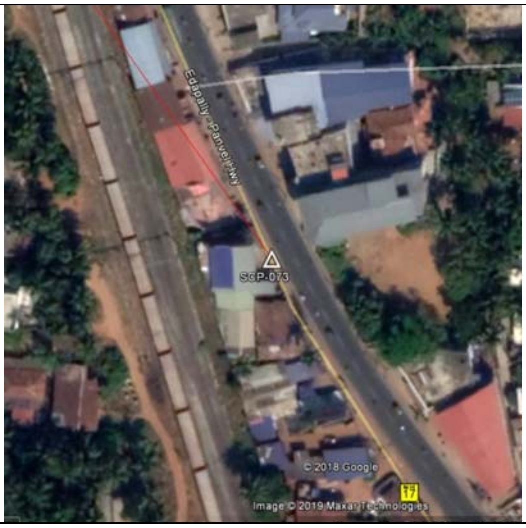
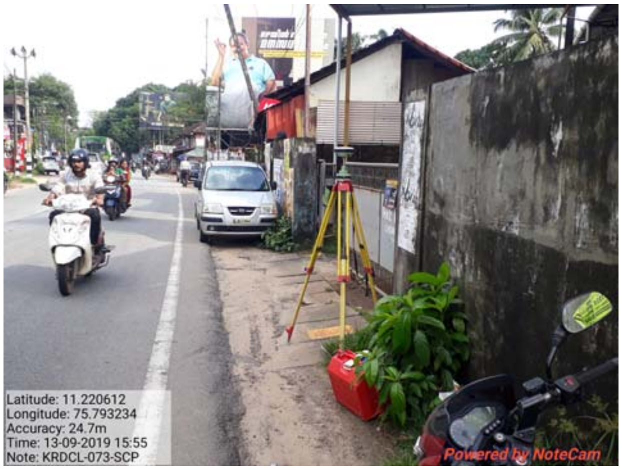
DGPS SURVEY REPORT

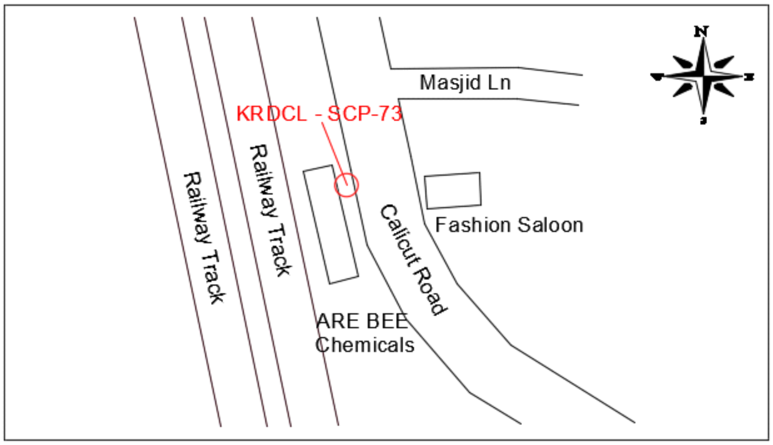
CLIENT	CONSULTANT	SURVEYED BY	DATE : 13-09-2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-073-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
11° 13' 13.25098" N	75° 47' 35.73999" E	-83.534	586596.465	1240460.187	9.341

DESCRIPTION	The survey station, KRDCL-073-SCP is marked with red and white paint and nail point on the top of a concrete slab covering over a drainage and is on the side of the Callicut BT road. The survey station is near by railway track. It is approximately 5 metres away from the ARE BEE chemicals.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
 Edappally-Panvel Hwy SCP-073 © 2018 Google Image © 2019 Maxar Technologies	 Latitude: 11.220612 Longitude: 75.793234 Accuracy: 24.7m Time: 13-09-2019 15:55 Note: KRDCL-073-SCP Powered by NoteCam



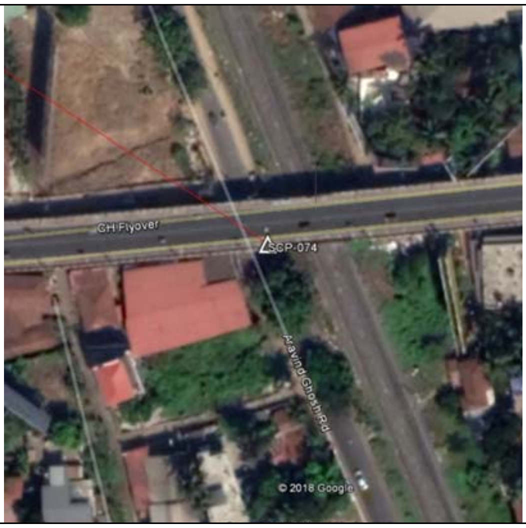
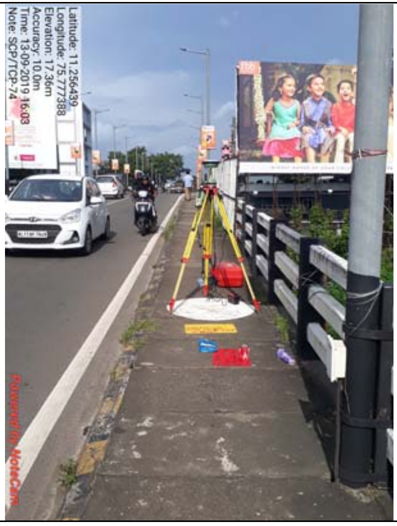
DGPS SURVEY REPORT

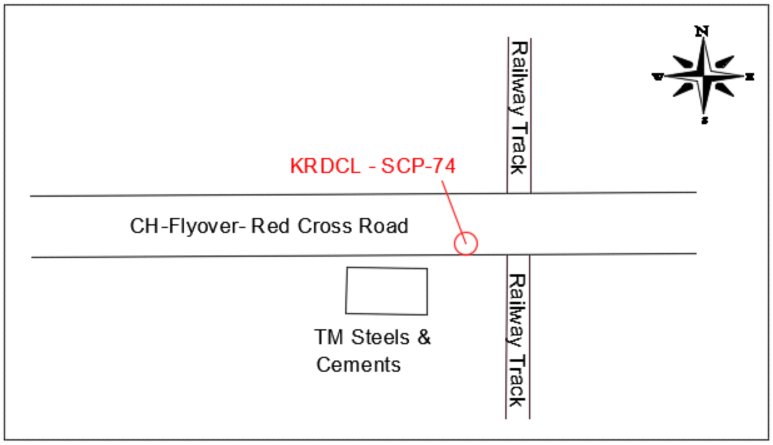
CLIENT	CONSULTANT	SURVEYED BY	DATE : 13-09-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID
			KRDCL-074-SCP/TCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
11° 15' 23.24437" N	75° 46' 38.69849" E	-78.035	584856.099	1244448.598	14.706

DESCRIPTION	The survey station, KRDCL-074-SCP/TCP is marked with white circular paint and nail point on the top of the CH flyover, an over the railway bridge of the Red cross road. The survey station is near by TM steels and cement shop. It is approximately 2 metres away from the electric pole.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	 Latitude: 11.256439 Longitude: 75.777388 Elevation: 17.36m Accuracy: 10.0m Time: 13-09-2019 16:03 Note: SCP/TCP-74 Powered by NoteCam



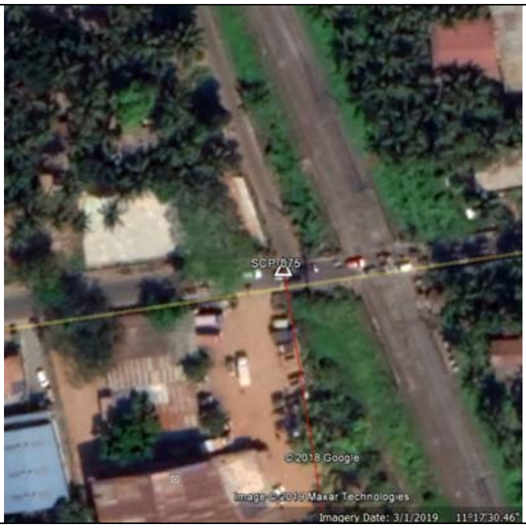
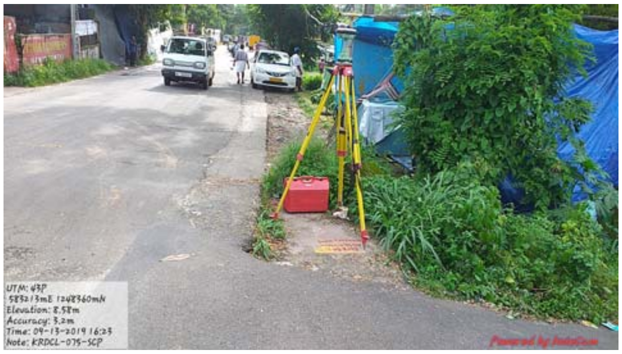
DGPS SURVEY REPORT

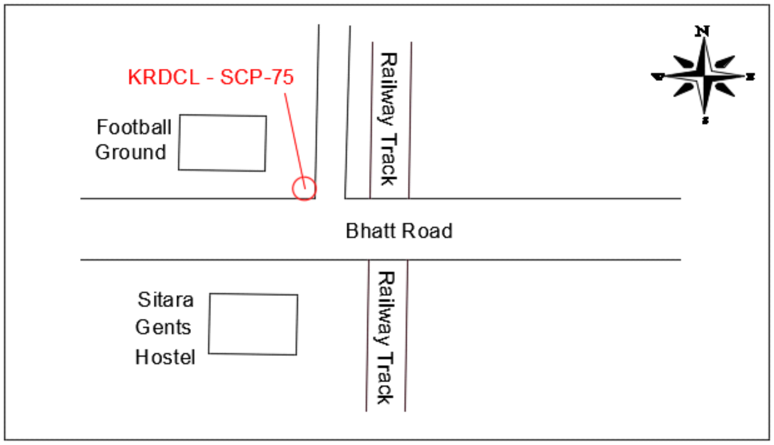
CLIENT	CONSULTANT	SURVEYED BY	DATE : 13-09-2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-075-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
11° 17' 30.62263" N	75° 45' 44.81325" E	-86.094	583212.037	1248357.004	6.629

DESCRIPTION	The survey station, KRDCL-075-SCP is marked with red and white paint and nail point on the top of a concrete slab covering over a drainage and is on the side of the Bhatt road. The survey station is near by sitara gents hostel. It is approximately 20 metres away from the electric pole.

LOCATION ON GOOGLE MAP	**FIELD PHOTOGRAPH**
 SCP-075 © 2018 Google Image © 2019 Maxar Technologies Imagery Date: 3/1/2019 11°17'30.46"	 UTM: 43P 583213mE 1248360mN Elevation: 8.58m Accuracy: 3.2m Time: 09-13-2019 16:23 Note: KRDCL-075-SCP



DGPS SURVEY REPORT

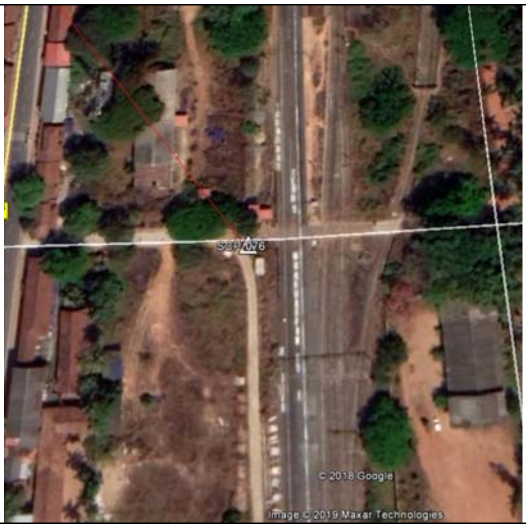
CLIENT	CONSULTANT	SURVEYED BY	DATE : 2/10/2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-076-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

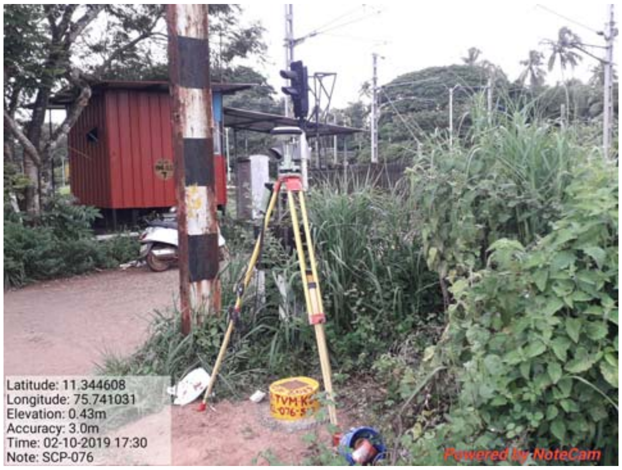
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
11° 20' 40.70769" N	75° 44' 27.69961" E	-88.253	580859.307	1254189.851	4.437

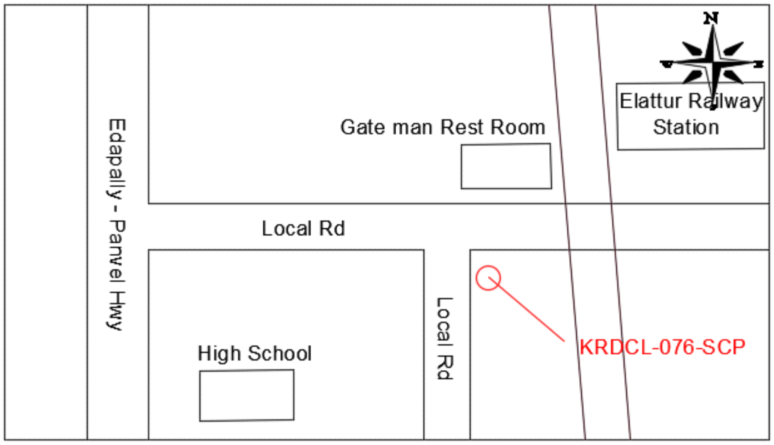
DESCRIPTION	The survey station, KRDCL-076-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of local village road parallel to the railway track near the Elatthur railway station.. The survey station is near by railway crossing. It is approximately 1 metres away from the electric pole.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





DGPS SURVEY REPORT

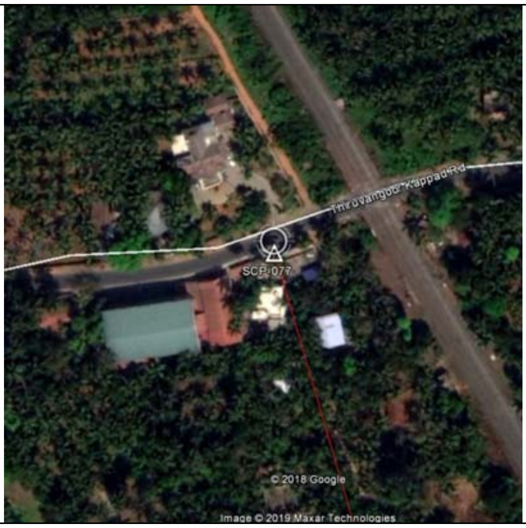
CLIENT	CONSULTANT	SURVEYED BY	DATE : 13-09-2019
			DGPS POINT ID
			KRDCL-077-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

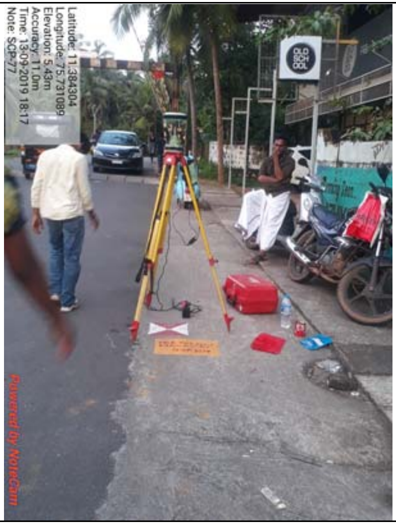
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
11° 23' 03.50999" N	75° 43' 51.98245" E	-88.905	579765.617	1258573.585	3.734

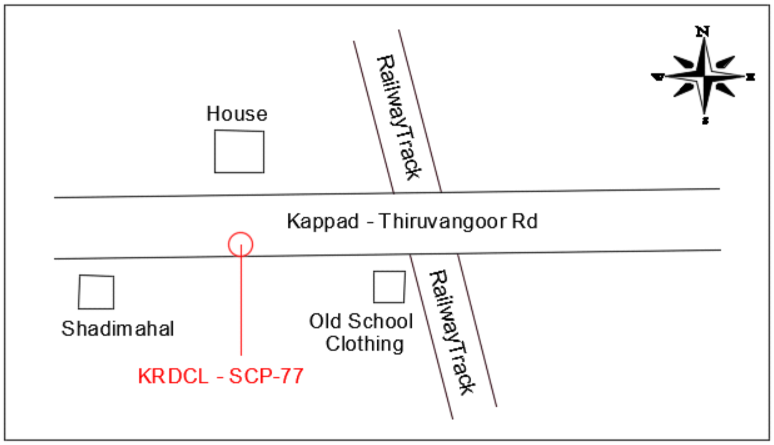
DESCRIPTION	The survey station, KRDCL-077-SCP is marked with red and white paint and nail point on the top of the Kappad-Thiruvangoor BT road. The survey station is near by railway crossing. It is approximately 40 metres away from the shadi mahal.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





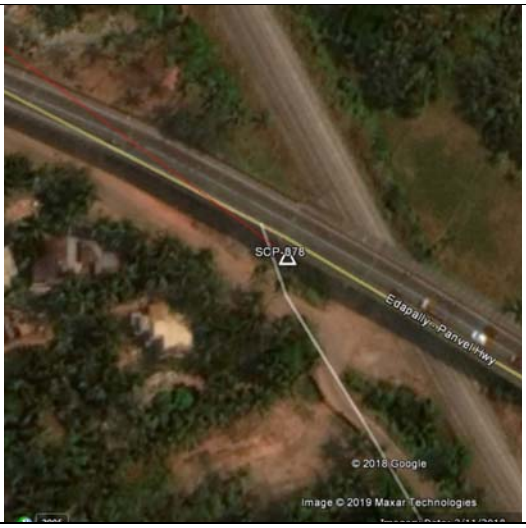
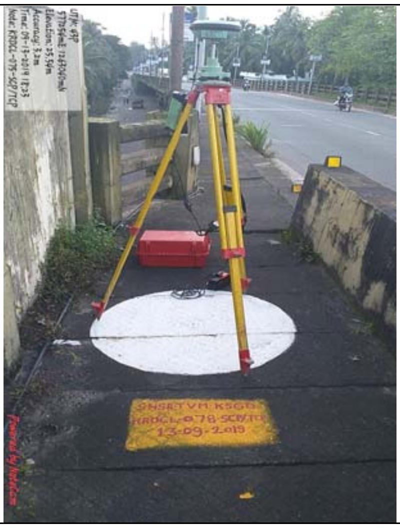
DGPS SURVEY REPORT

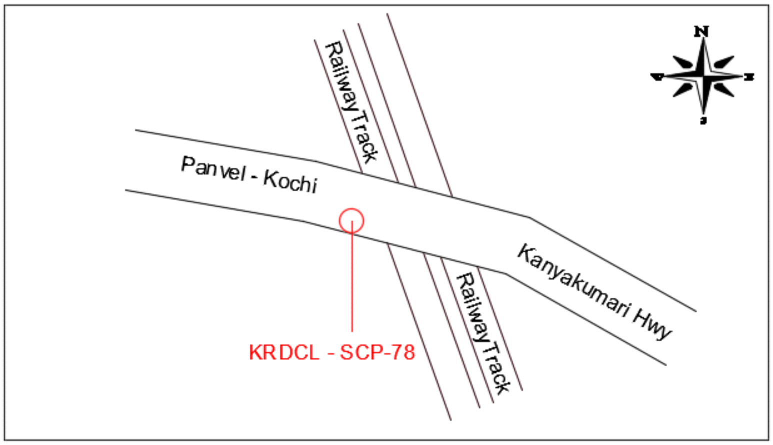
CLIENT	CONSULTANT	SURVEYED BY	
KRDCL	SYSTRA	GEO KNO	DATE : 13-09-2019
			DGPS POINT ID
			KRDCL-078-SCP/TCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
11° 25' 29.24042" N	75° 42' 29.39952" E	-75.528	577251.774	1263043.785	17.049

DESCRIPTION	The survey station, KRDCL-078-SCP/TCP is marked with white circular paint and nail point on the top of the over the railway bridge of the Panvel-Kochi-Kanniyakumari highway near Koyilandy town. The survey station is near by retaining wall. It is approximately 5 metres away from the street lamp.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	



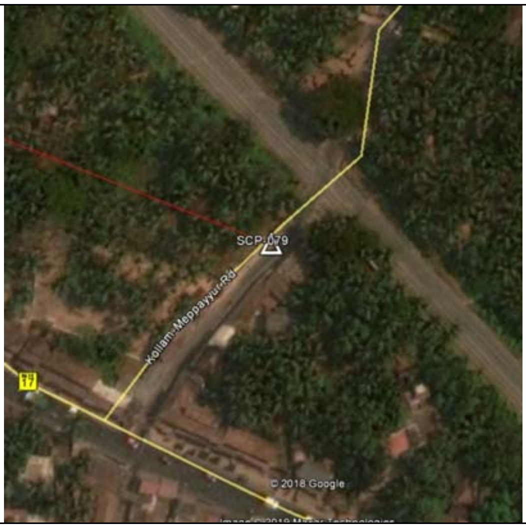
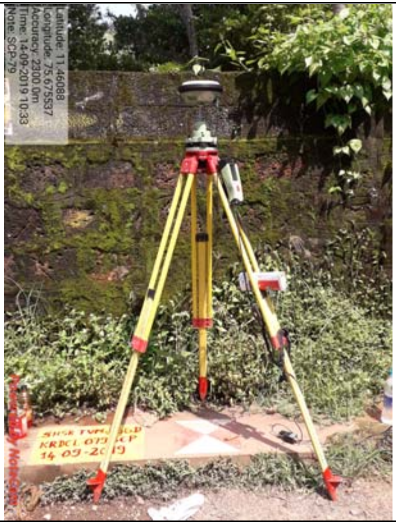
DGPS SURVEY REPORT

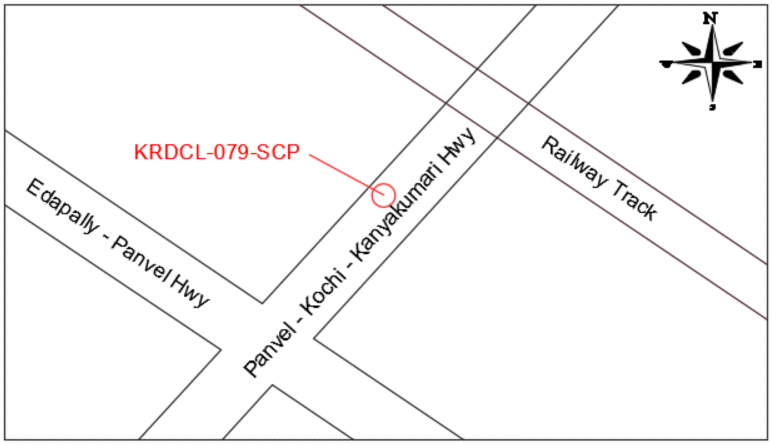
CLIENT	CONSULTANT	SURVEYED BY	DATE : 14-09-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-079-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
11° 27' 24.32359" N	75° 41' 00.27194" E	-85.616	574542.550	1266572.292	6.925

DESCRIPTION	The survey station, KRDCL-079-SCP is marked with red and white paint and nail point on the top of the Concrete slab covering a drainage on the side of the Panvel-Kochi-Kanniyakumari BT road. The survey station is near by kollam railway crossing. It is approximately 5 metres away from the electric pole.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	



DGPS SURVEY REPORT

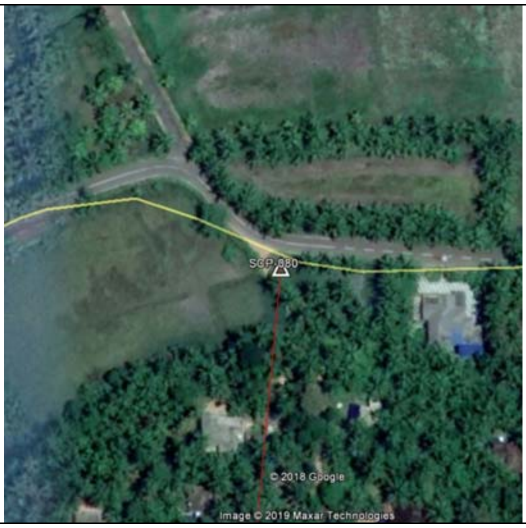
CLIENT	CONSULTANT	SURVEYED BY	DATE : 2/10/2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-080-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

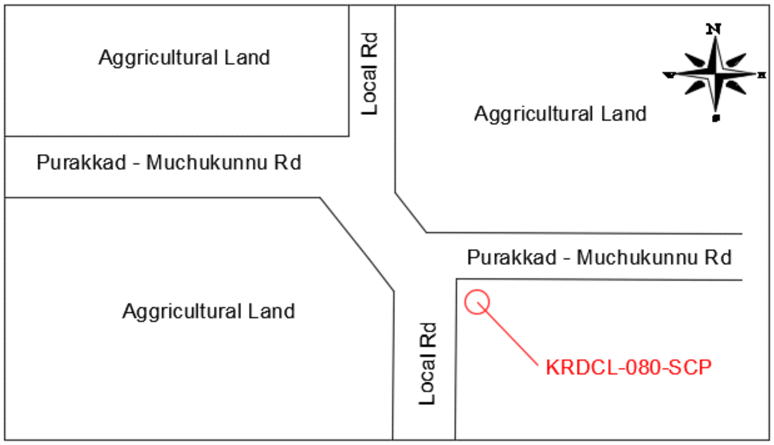
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
11° 29' 49.41826" N	75° 38' 34.49752" E	-90.373	570115.675	1271018.980	2.098

DESCRIPTION	The survey station, KRDCL-080-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Purakkad-Muchukunnu Road. The survey station is near by residential building. It is approximately 3 metres away from the street lamp.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH



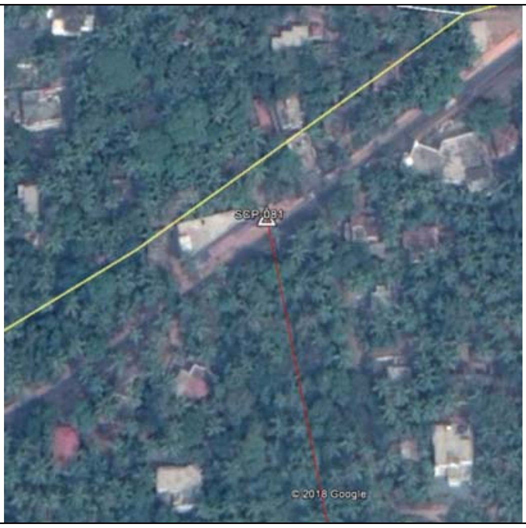
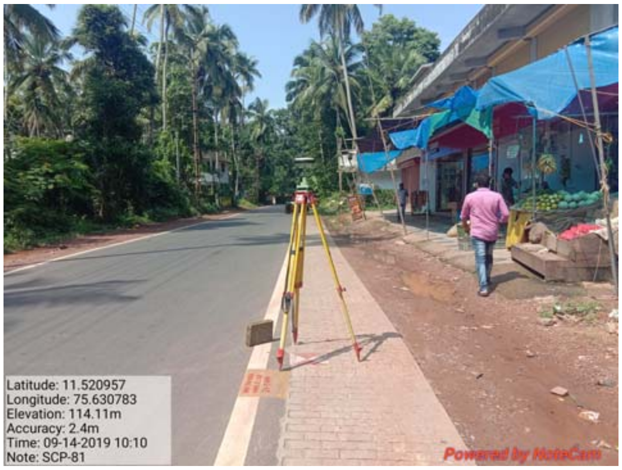
DGPS SURVEY REPORT

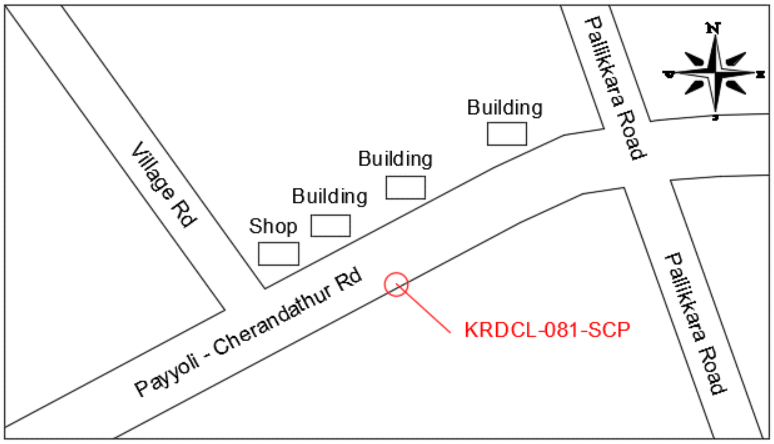
CLIENT	CONSULTANT	SURVEYED BY	DATE : 14-09-2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-081-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
11° 31' 15.51663" N	75° 37' 51.03564" E	-81.624	568793.176	1273660.729	10.821

DESCRIPTION	The survey station, KRDCL-081-SCP is marked with red and white paint and nail point on the top of the tiled pavement on the side of the Payyoli-Cheranndathur BT road. The survey station is near by vegetable shop. It is approximately 20 metres away from the electric pole.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	 Latitude: 11.520957 Longitude: 75.630783 Elevation: 114.11m Accuracy: 2.4m Time: 09-14-2019 10:10 Note: SCP-81 Powered by NoteCam



DGPS SURVEY REPORT

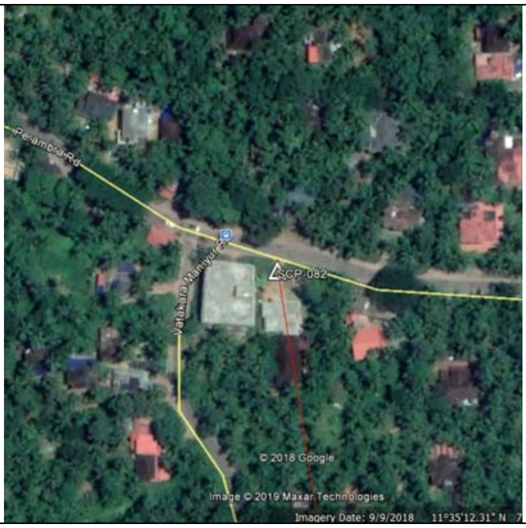
CLIENT	CONSULTANT	SURVEYED BY	DATE : 14-09-2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-082-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

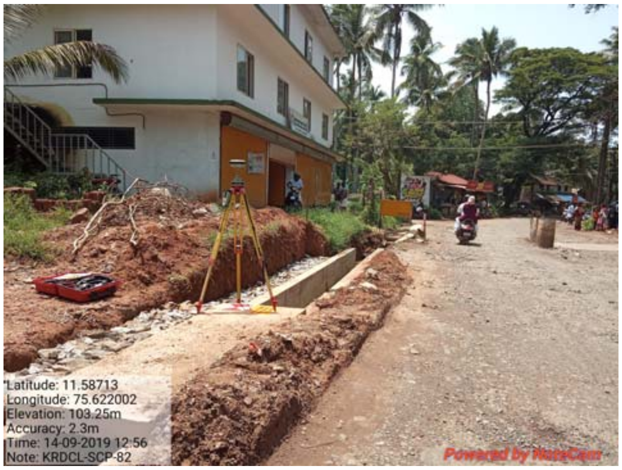
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
11° 35' 13.68492" N	75° 37' 19.11743" E	-81.059	567810.381	1280974.394	11.379

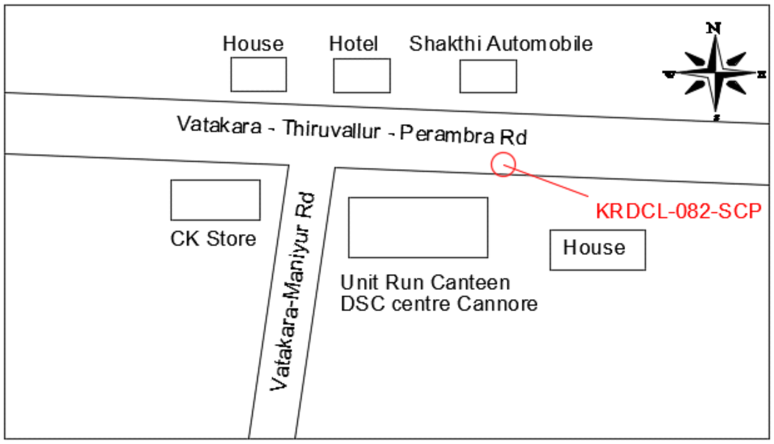
DESCRIPTION	The survey station, KRDCL-082-SCP is marked with red and white paint and nail point on the top of concrete slab covering a drinage on the side of the Vattakara-thiruvallur-Perambara BT road. The survey station is near by unitrun canteen. It is approximately 40 metres away from the shakthi auto mobile.

LOCATION ON GOOGLE MAP


Perambra Rd
Vatakara-Maniyur Rd
SCP-082
© 2018 Google
Image © 2019 Maxar Technologies
Imagery Date: 9/9/2018   11°35'12.31" N 7

FIELD PHOTOGRAPH





DGPS SURVEY REPORT

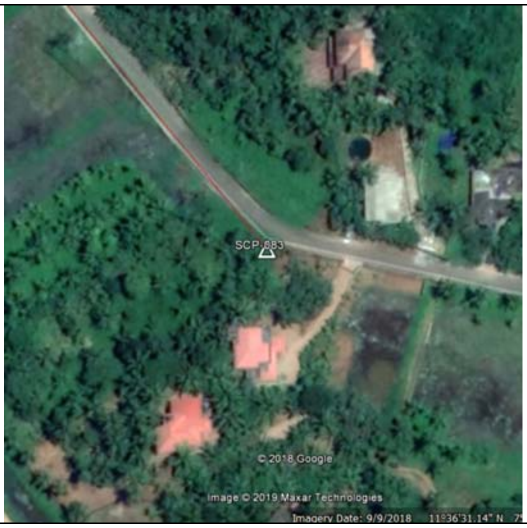
CLIENT	CONSULTANT	SURVEYED BY	DATE : 14-09-2019
			DGPS POINT ID
			KRDCL-083-SCP/TCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

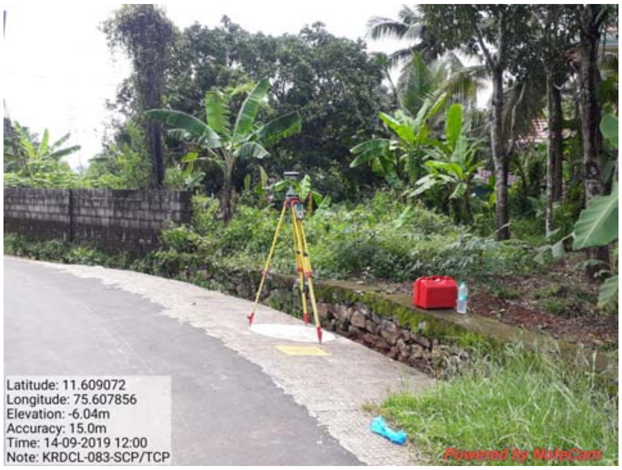
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
11° 36' 30.75283" N	75° 36' 29.26569" E	-86.743	566295.546	1283338.423	5.684

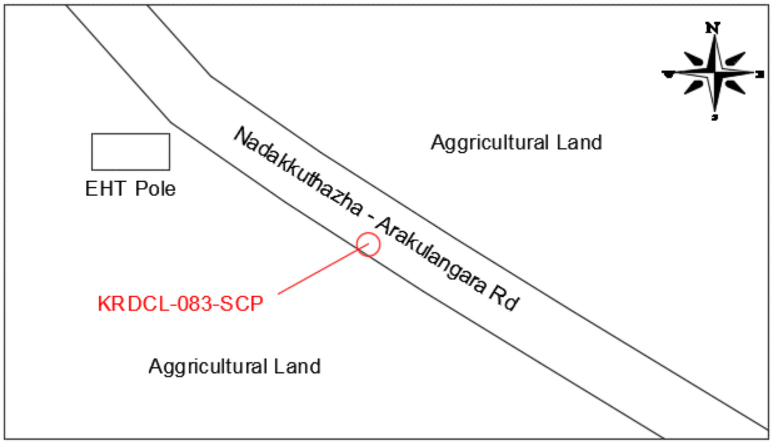
DESCRIPTION	The survey station, KRDCL-083-SCP/TCP is marked with white circular paint and nail point on the top of the Nadakuthazha-Alangulakara BT road. The survey station is near by cultivation land. It is approximately 10 metres away from the EHT pole.

LOCATION ON GOOGLE MAP


SCP-083
© 2018 Google
Image © 2019 Maxar Technologies
Imagery Date: 9/9/2018 11°36'31.14" N

FIELD PHOTOGRAPH





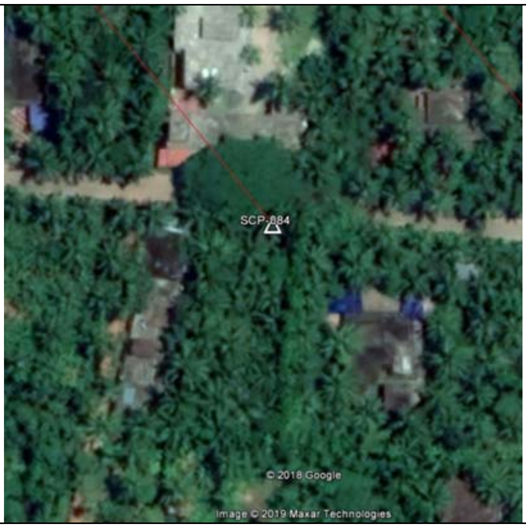
DGPS SURVEY REPORT

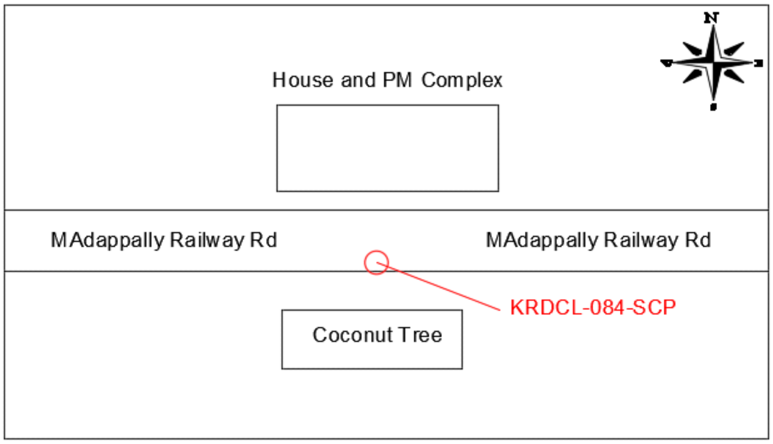
CLIENT	CONSULTANT	SURVEYED BY	
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DATE : 14-09-2019 DGPS POINT ID KRDCL-084-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
11° 38' 50.38666" N	75° 34' 31.61559" E	-84.201	562724.058	1287620.115	8.268

DESCRIPTION	The survey station, KRDCL-084-SCP is marked with red and white paint and nail point on the top of the Madappally Railway BT road. The survey station is near by PM complex. It is approximately 15 metres away from the electric pole.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	Latitude: 11.647198 Longitude: 75.575607 Elevation: -32.19m Accuracy: 34.0m Time: 14-09-2019 14:58 Note: SCP-84 Powered by NoteCam



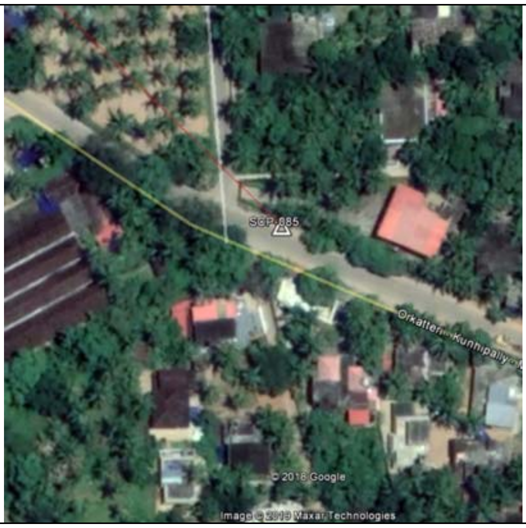
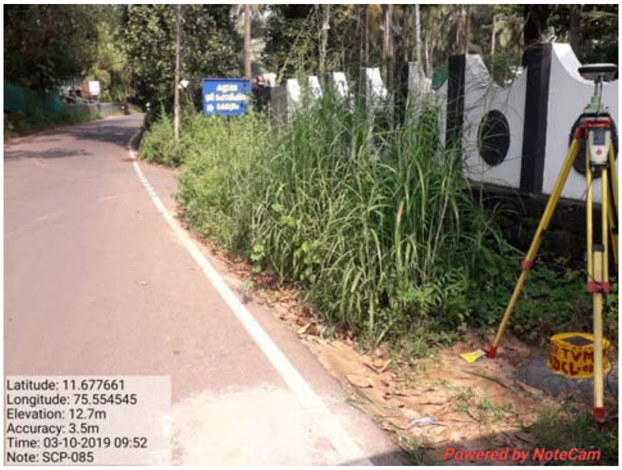
DGPS SURVEY REPORT

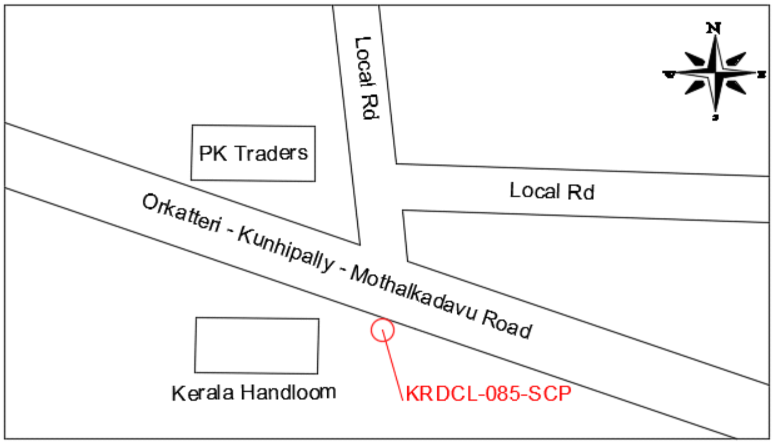
CLIENT	CONSULTANT	SURVEYED BY	DATE : 3/10/2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-085-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
11° 40' 39.61486" N	75° 33' 16.36739" E	-84.742	560439.073	1290970.712	7.726

DESCRIPTION	The survey station, KRDCL-085-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Orkatheri-Kunjipally Road. The survey station is near by signboard. It is approximately 10 metres away from the electric pole.

LOCATION ON GOOGLE MAP	**FIELD PHOTOGRAPH**
 SCP-085 Orkatteri-Kunnipally-R © 2018 Google Image © 2019 Maxar Technologies	 Latitude: 11.677661 Longitude: 75.554545 Elevation: 12.7m Accuracy: 3.5m Time: 03-10-2019 09:52 Note: SCP-085 Powered by NoteCam



DGPS SURVEY REPORT

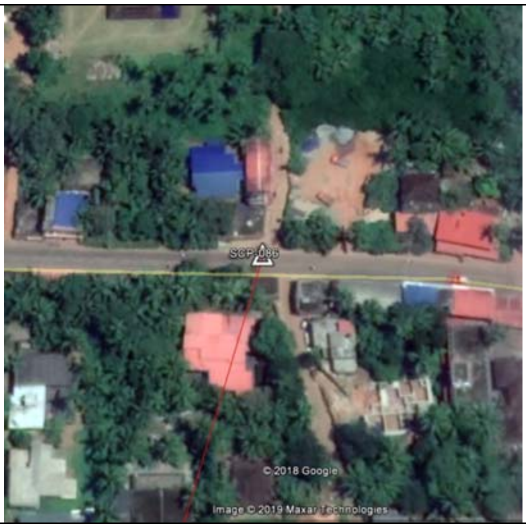
CLIENT	CONSULTANT	SURVEYED BY	DATE : 14-09-2019
			DGPS POINT ID
			KRDCL-086-SCP

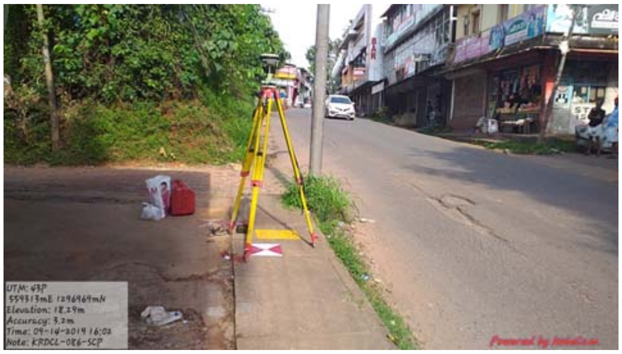
PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

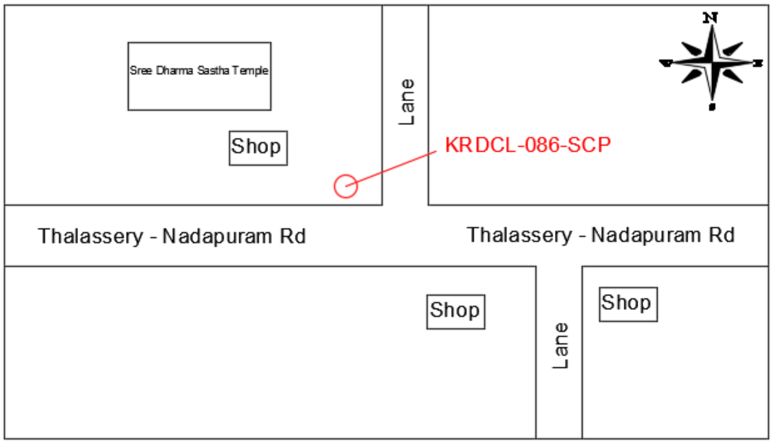
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
11° 43' 55.12238" N	75° 32' 39.56581" E	-74.253	559313.317	1296973.908	18.185

DESCRIPTION	The survey station, KRDCL-086-SCP is marked with red and white paint and nail point on the top of the concrete slab covering a drainage on the side of the Thalassery-Nadapuram BT road. The survey station is near by bar and restorent. It is approximately 3 metres away from the electric pole.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH




UTM: 43P
559313mE 1296969mN
Elevation: 18.29m
Accuracy: 3.2m
Time: 09-14-2019 16:03
Note: KRDCL-086-SCP


N
Sree Dharma Sastha Temple
Shop
Lane
KRDCL-086-SCP
Thalassery - Nadapuram Rd
Thalassery - Nadapuram Rd
Shop
Lane
Shop

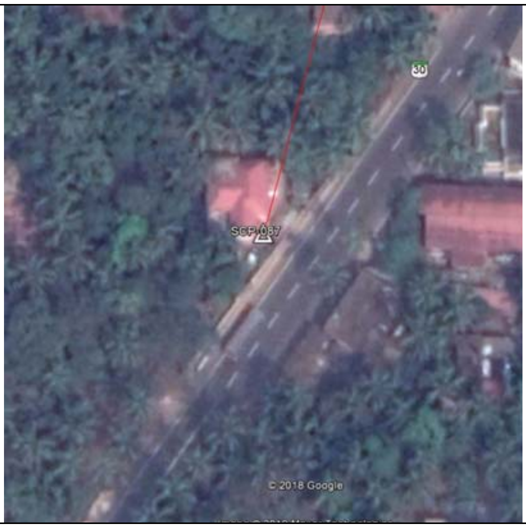
DGPS SURVEY REPORT

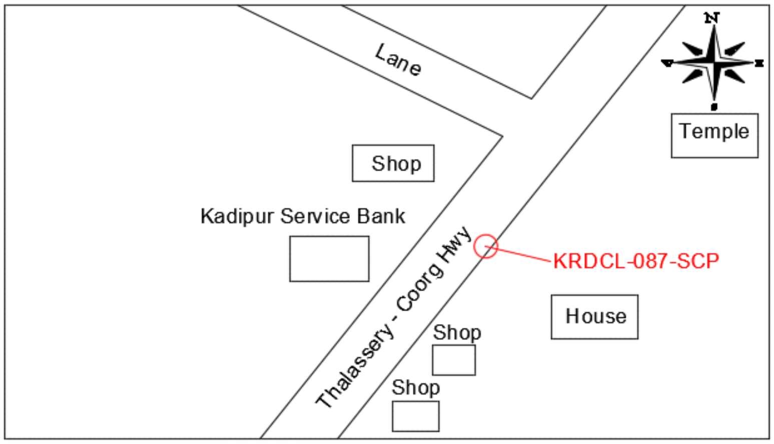
CLIENT	CONSULTANT	SURVEYED BY	DATE : 14-09-2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-087-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
11° 46' 57.27225" N	75° 31' 49.63699" E	-78.583	557791.445	1302566.088	13.778

DESCRIPTION	The survey station, KRDCL-087-SCP is marked with red and white paint and nail point on the top of the concrete slab covering a drainage on top of the Thalaserry-Coorg highway BT road. The survey station is near by kadipur service bunk. It is approximately 15 metres away from the electric pole.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	



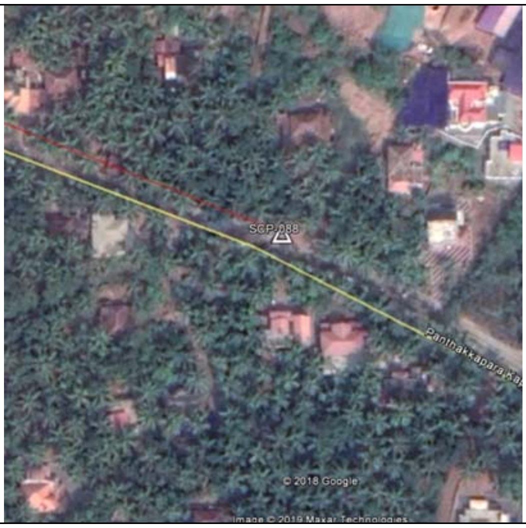
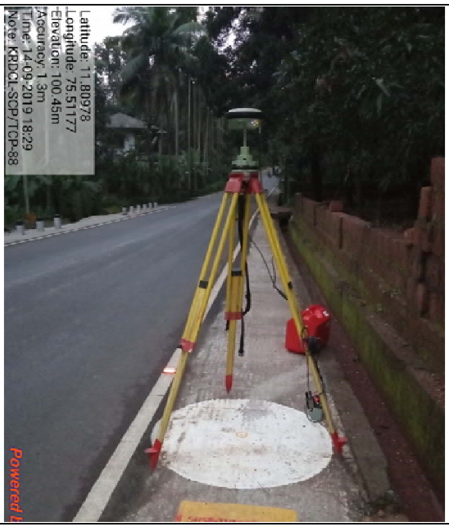
DGPS SURVEY REPORT

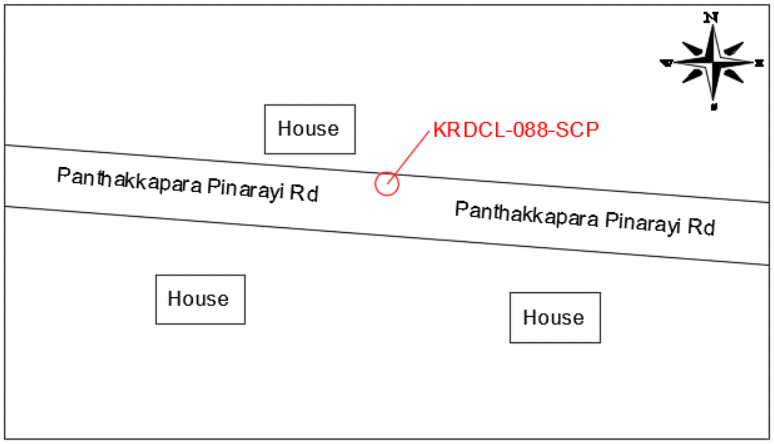
CLIENT KRDCL	CONSULTANT SYSTRA	SURVEYED BY GEO KNO	DATE : 14-09-2019
			DGPS POINT ID
			KRDCL-088-SCP/TCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
11° 48' 35.24870" N	75° 30' 42.66280" E	-81.347	555759.055	1305571.848	10.916

DESCRIPTION	The survey station, KRDCL-088-SCP/TCP is marked with white circular paint and nail point on the top of the Panthakkapara-Kappumal BT road. The survey station is near by residential building,pinarayi vilaage. It is approximately 15 metres away from the chalil sree muthappan madawpam temple.

LOCATION ON GOOGLE MAP	**FIELD PHOTOGRAPH**
	



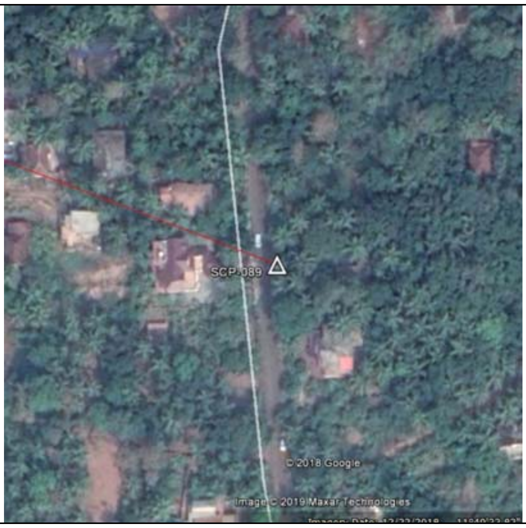
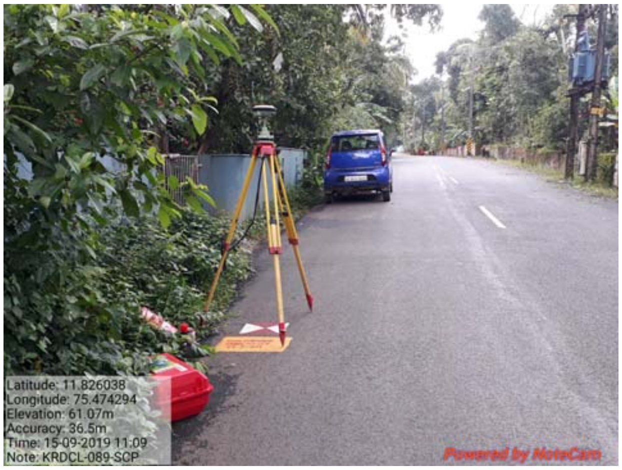
DGPS SURVEY REPORT

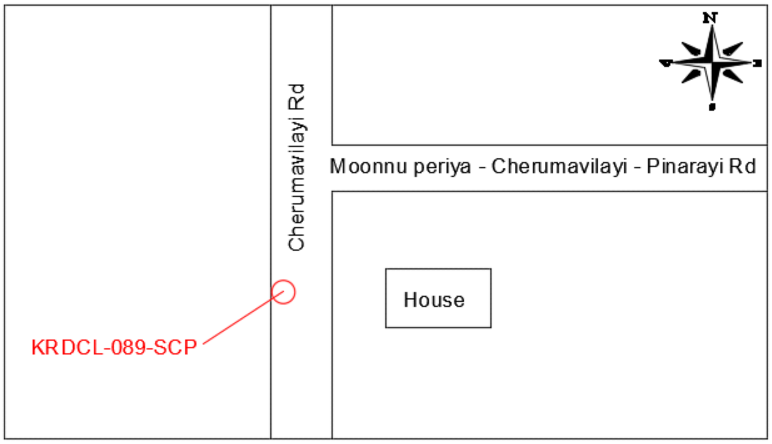
CLIENT	CONSULTANT	SURVEYED BY	DATE : 15-09-2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-089-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
11° 49' 33.55255" N	75° 28' 27.25584" E	-69.925	551658.509	1307355.533	22.310

DESCRIPTION	The survey station, KRDCL-089-SCP is marked with red and white paint and nail point on the top of theCheruvillayi BT road. The survey station is near by vimalalayam house. It is approximately 15 metres away from the transformer.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	 Latitude: 11.826038 Longitude: 75.474294 Elevation: 61.07m Accuracy: 36.5m Time: 15-09-2019 11:09 Note: KRDCL-089-SCP Powered by NoteCam



DGPS SURVEY REPORT

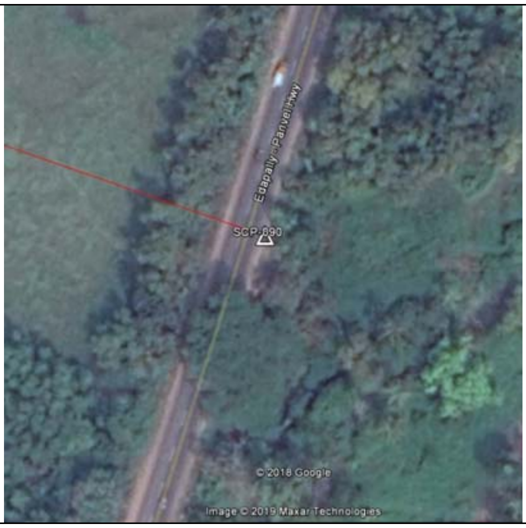
CLIENT	CONSULTANT	SURVEYED BY	DATE : 15-09-2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-090-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

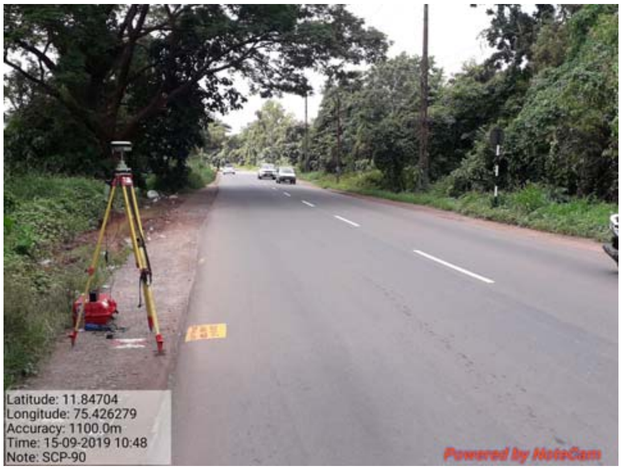
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
11° 50' 43.85768" N	75° 25' 42.96835" E	-85.597	546684.059	1309507.037	6.557

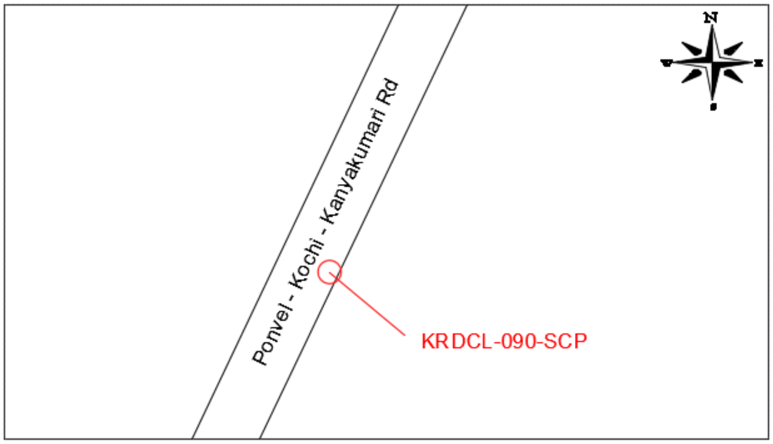
DESCRIPTION	The survey station, KRDCL-090-SCP is marked with red and white paint and nail point on the top of the Panvel-Kochi-Kanniyakumari BT road. The survey station is near by railway track. It is approximately 20 metres away from the electric pole.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





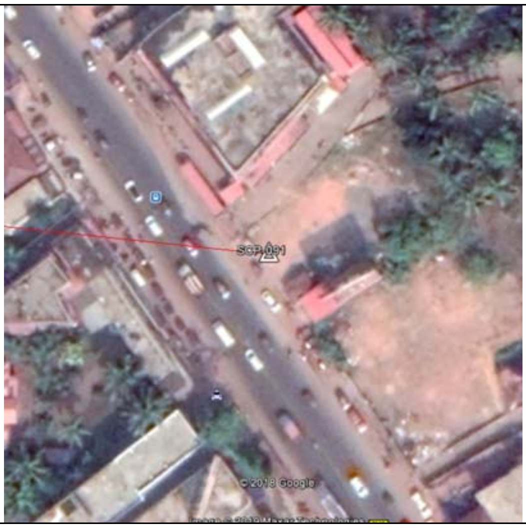
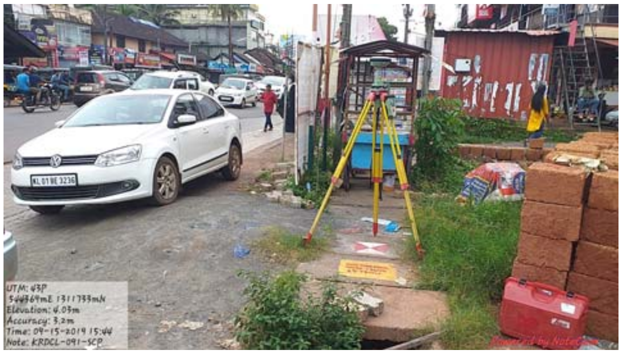
DGPS SURVEY REPORT

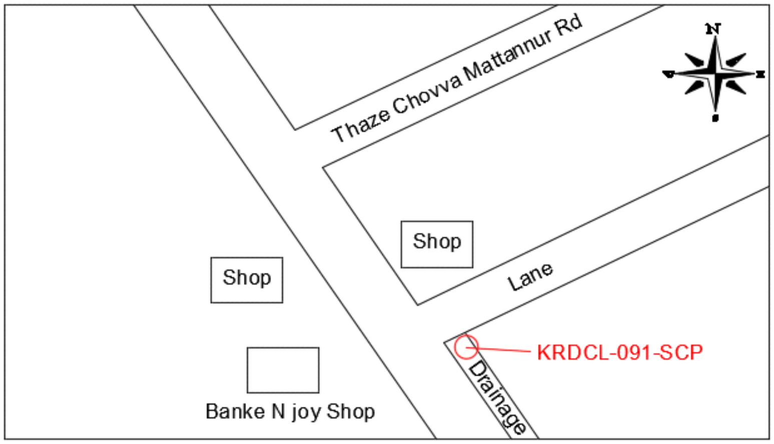
CLIENT	CONSULTANT	SURVEYED BY	DATE : 15-09-2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-091-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
11° 51' 56.49543" N	75° 24' 26.51568" E	-87.104	544367.611	1311734.752	4.976

DESCRIPTION	The survey station, KRDCL-091-SCP is marked with red and white paint and nail point on the top of the concrete slab covering a drainage on the side of the NH-17 BT road. The survey station is near by bake'n'joy shop,kannur road. It is approximately 10 metres away from the bus stop.

LOCATION ON GOOGLE MAP	**FIELD PHOTOGRAPH**
	



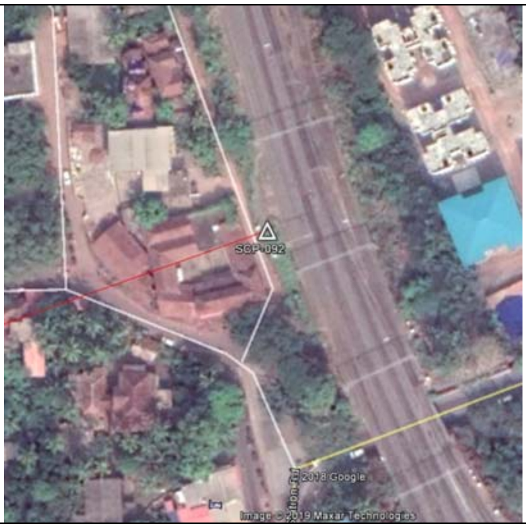
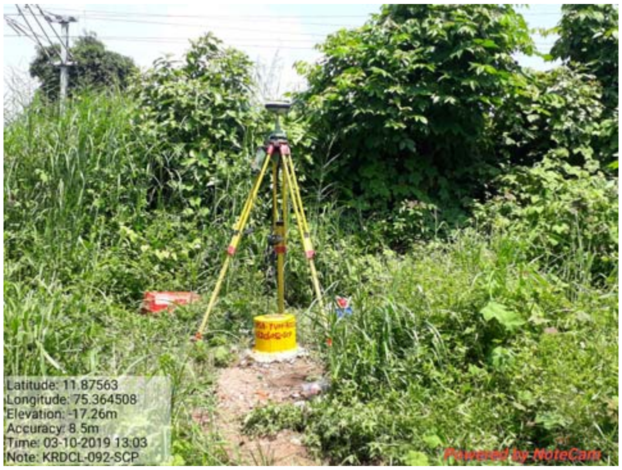
DGPS SURVEY REPORT

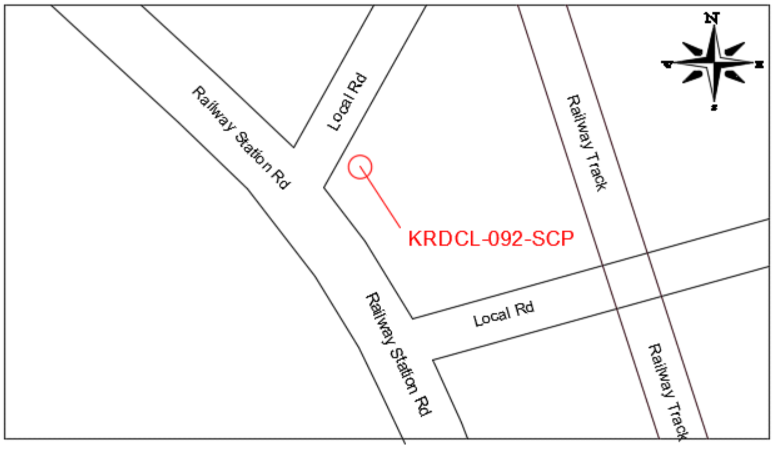
CLIENT	CONSULTANT	SURVEYED BY	DATE : 3/10/2019
KRDCL			DGPS POINT ID
			KRDCL-092-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
11° 52' 32.34467" N	75° 21' 52.67151" E	-82.567	539711.744	1312829.465	9.498

DESCRIPTION	The survey station, KRDCL-092-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. . The survey station is near by on the side of the mud road infront of sreedaran company private limited. It is approximately 5 metres away from the railway track.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	 Latitude: 11.87563 Longitude: 75.364508 Elevation: -17.26m Accuracy: 8.5m Time: 03-10-2019 13:03 Note: KRDCL-092-SCP Powered by NoteCam



DGPS SURVEY REPORT

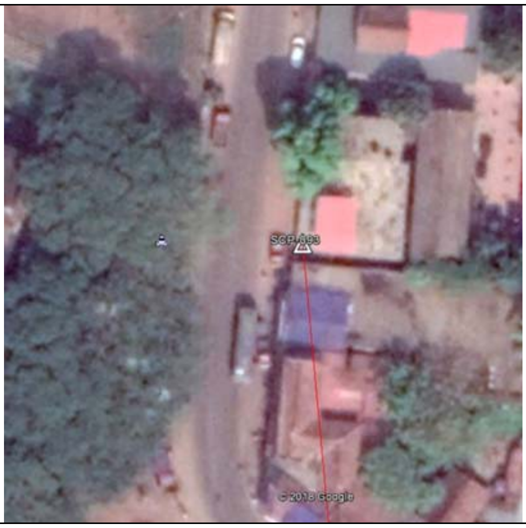
CLIENT KRDCL	CONSULTANT SYSTRA	SURVEYED BY GEO KNO	DATE : 15-09-2019 DGPS POINT ID KRDCL-093-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

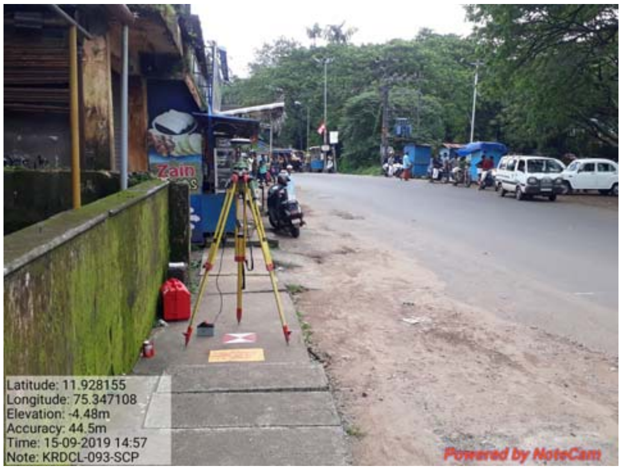
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
11° 55' 40.98403" N	75° 20' 49.53376" E	-88.671	537794.401	1318621.351	3.221

DESCRIPTION	The survey station, KRDCL-093-SCP is marked with red and white paint and nail point on the top of the concrete slab covering a drainage on the side of the Vazhapattinam-Azhikkal BT road. The survey station is near by civil supply godown,valapattanam. It is approximately 10 metres away from the grama panchayat office.

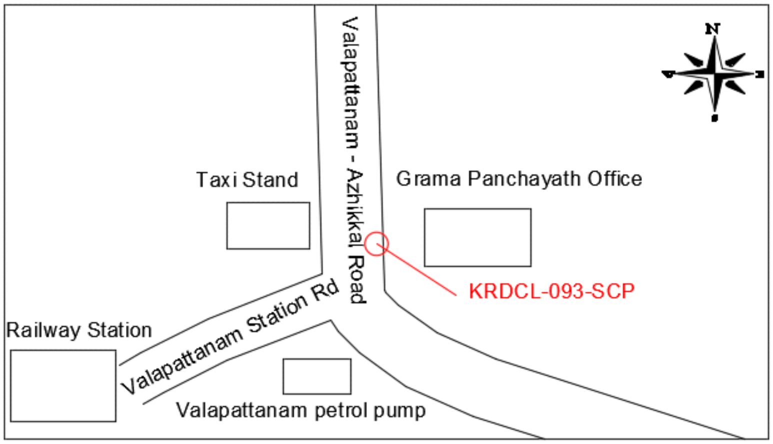
LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH



Latitude: 11.928155
Longitude: 75.347108
Elevation: -4.48m
Accuracy: 44.5m
Time: 15-09-2019 14:57
Note: KRDCL-093-SCP



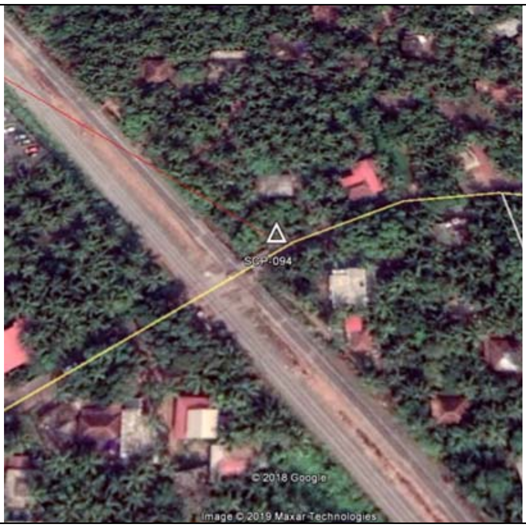
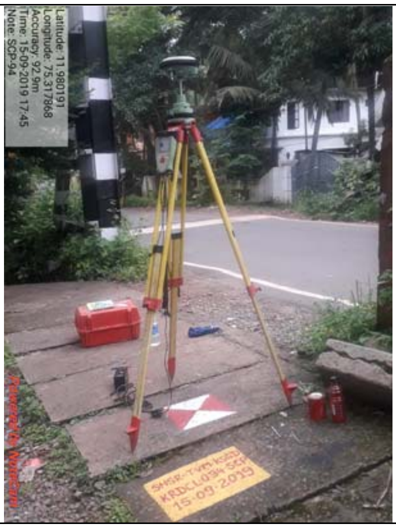
DGPS SURVEY REPORT

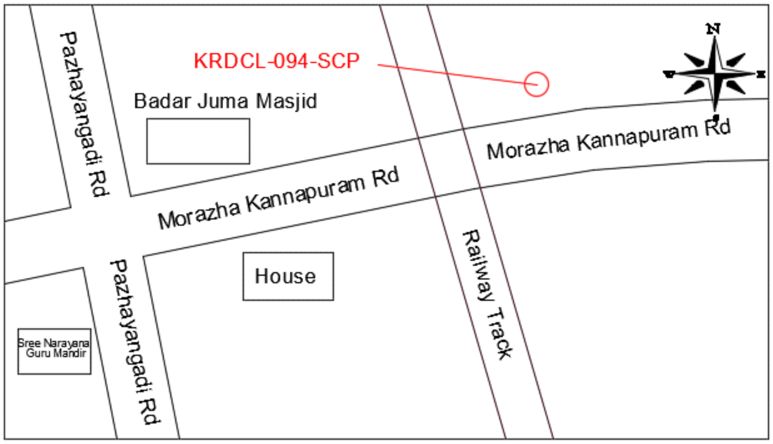
CLIENT	CONSULTANT	SURVEYED BY	DATE : 15-09-2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-094-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
11° 58' 49.20069" N	75° 19' 04.01495" E	-86.530	534596.121	1324398.872	5.112

DESCRIPTION	The survey station, KRDCL-094-SCP is marked with red and white paint and nail point on the top of the concrete slab covering the drainage on the side of the Morazha-Kannapuram BT road. The survey station is near by kannapuram-dharmasala road. It is approximately 20 metres away from the kannapuram railway crossing.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	 Latitude: 11.9801191 Longitude: 75.3177868 Accuracy: 92.9m Time: 15-09-2019 17:45 Note: SCP-94 KRDCL-094-SCP 15-09-2019



DGPS SURVEY REPORT

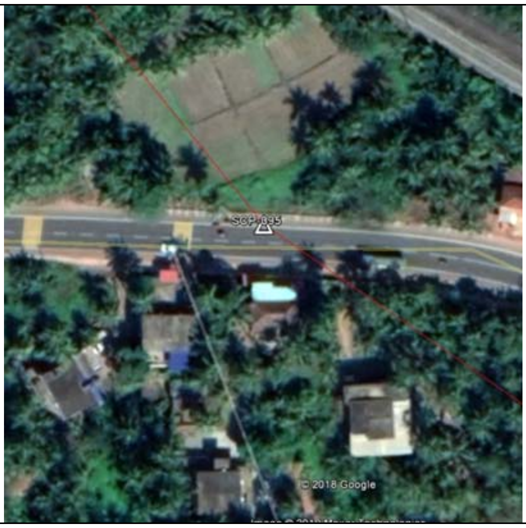
CLIENT	CONSULTANT	SURVEYED BY	DATE : 15-09-2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-095-SCP/TCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

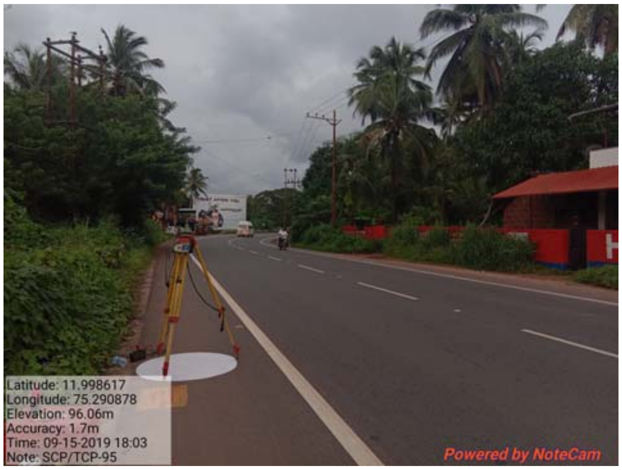
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
11° 59' 55.02599" N	75° 17' 27.20650" E	-89.259	531666.383	1326417.565	2.279

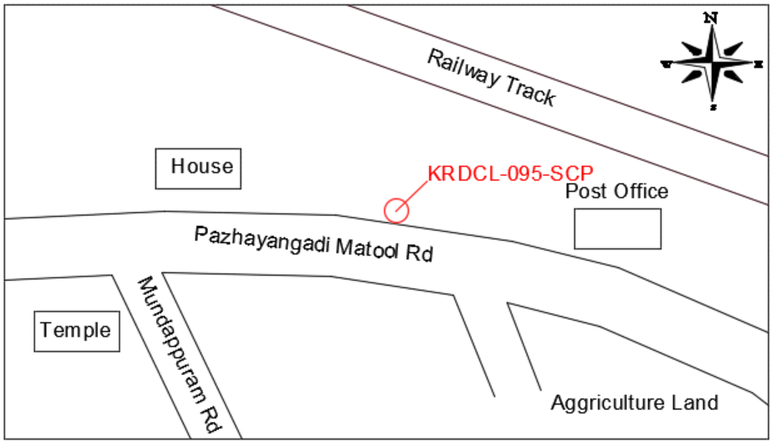
DESCRIPTION	The survey station, KRDCL-095-SCP/TCP is marked with white circular paint and nail point on the top of the Pilathara-Pappinisseri BT road. The survey station is near by vellarangal post office. It is approximately 15 metres away from the railway track.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





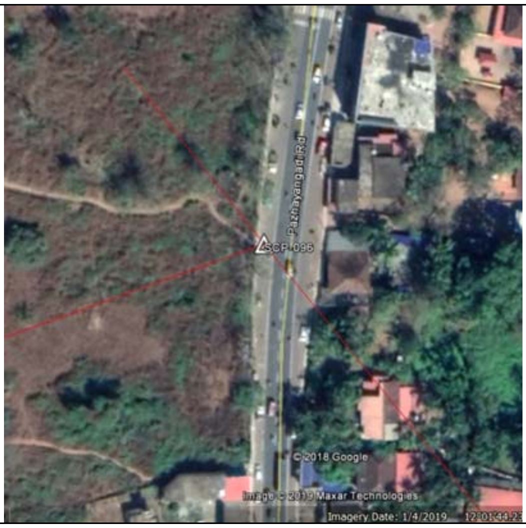
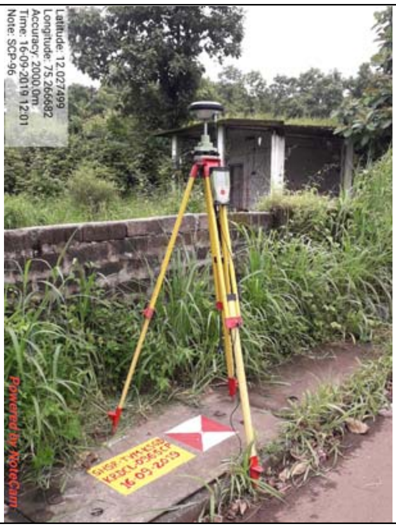
DGPS SURVEY REPORT

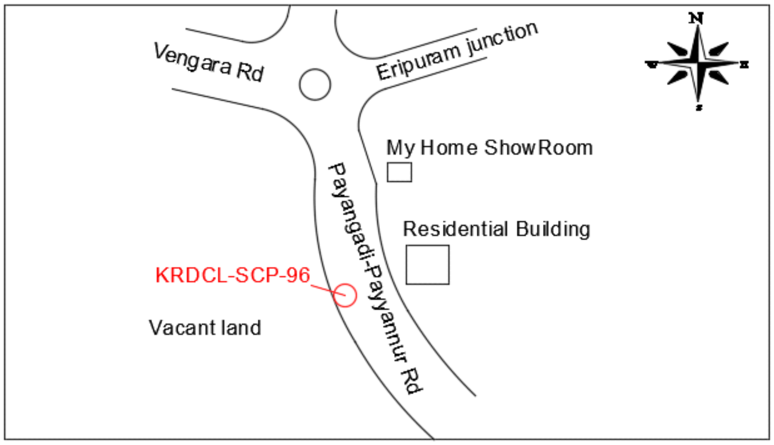
CLIENT	CONSULTANT	SURVEYED BY	DATE : 15-09-2019
			DGPS POINT ID
			KRDCL-096-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
12° 01' 44.10099" N	75° 15' 56.99987" E	-83.261	528935.378	1329765.207	8.088

DESCRIPTION	The survey station, KRDCL-096-SCP is marked with red and white paint and nail point on the top of the concrete slab covering the drainage on the side of the Payangadi-Payyannur BT road. The survey station is near by eripuram junction. It is approximately 8 metres away from the my home show room.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	



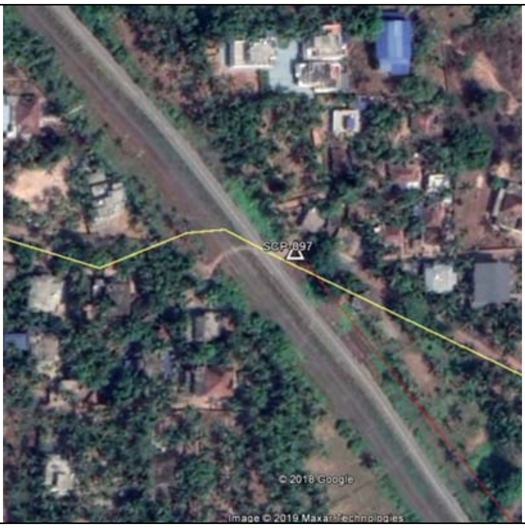
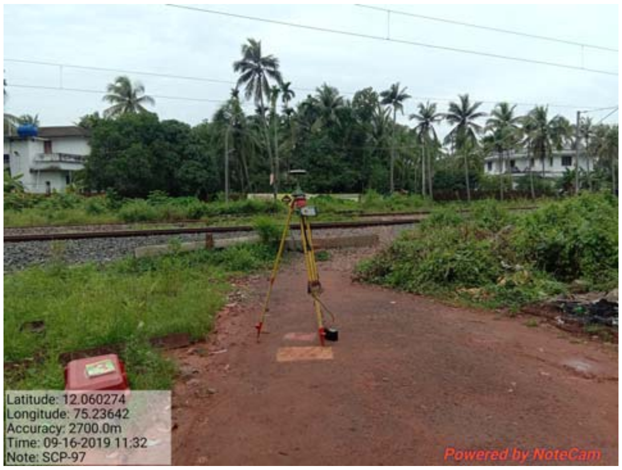
DGPS SURVEY REPORT

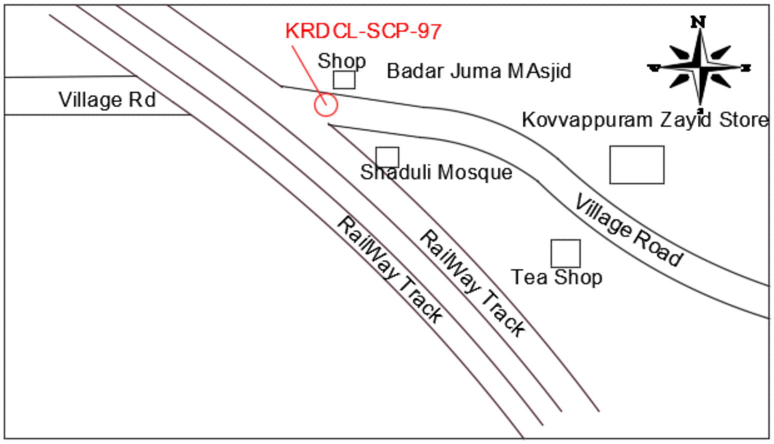
CLIENT	CONSULTANT	SURVEYED BY	DATE : 16-09-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-097-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
12° 03' 51.34345" N	75° 14' 13.84636" E	-87.288	525813.085	1333670.793	3.832

DESCRIPTION	The survey station, KRDCL-097-SCP is marked with red and white paint and nail point on the top of the village BT road. The survey station is near by zahid store,kowapuram. It is approximately 5 metres away from the railway track.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	



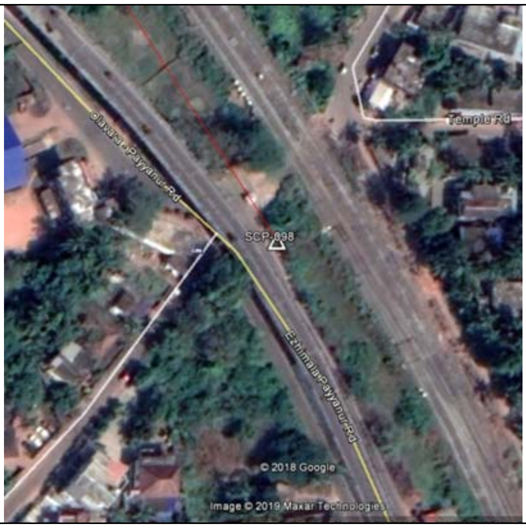
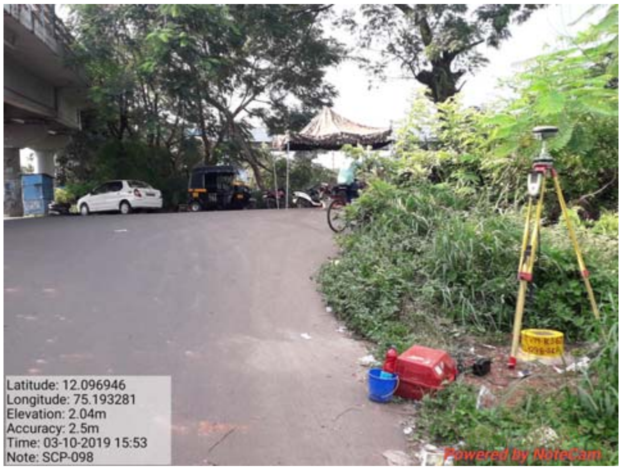
DGPS SURVEY REPORT

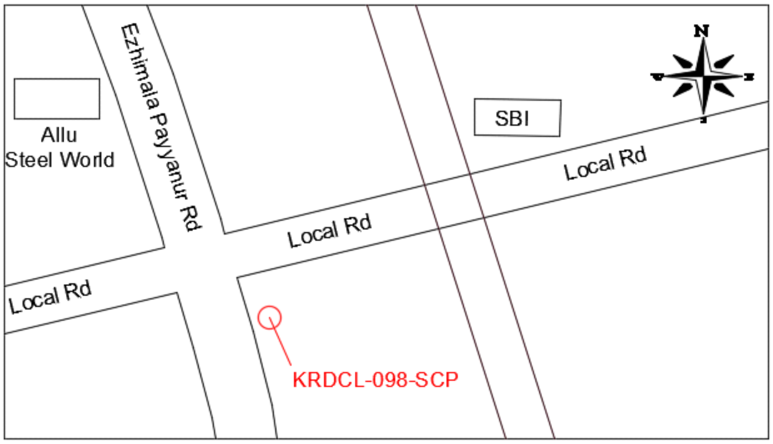
CLIENT	CONSULTANT	SURVEYED BY	DATE : 3/10/2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-098-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
12° 05' 49.19322" N	75° 11' 35.83896" E	-87.107	521033.705	1337286.970	3.801

DESCRIPTION	The survey station, KRDCL-098-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Ezhimala-Payyanoor road. The survey station is near by kotty railway station. It is approximately 15 metres away from the axis bank.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	



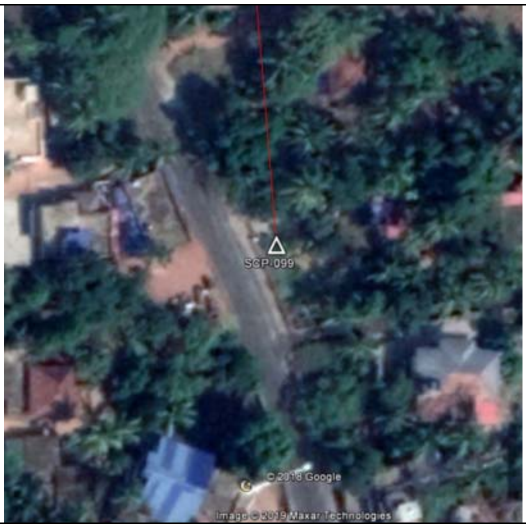
DGPS SURVEY REPORT

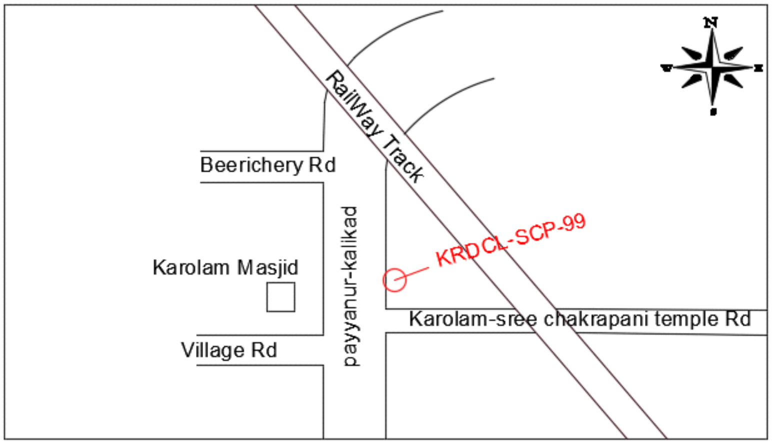
CLIENT	CONSULTANT	SURVEYED BY	DATE : 16-09-2019
KRDCL			DGPS POINT ID
			KRDCL-099-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
12° 07' 44.14403" N	75° 10' 44.27378" E	-84.780	519472.682	1340816.796	5.936

DESCRIPTION	The survey station, KRDCL-099-SCP is marked with red and white paint and nail point on the top of the concrete slab covering a drainage on top of the Payyannur-Kallikkad BT road. The survey station is near by karolam masjid. It is approximately 15 metres away from the glow car washing and polish interior.

LOCATION ON GOOGLE MAP	**FIELD PHOTOGRAPH**
	Latitude: 12.129616 Longitude: 75.178585 Accuracy: 110.0m Time: 16-09-2019 16:59 Note: SCP-99 Powered by NoteCam SHSR-TVM-KSGD KRDCL-099-SCP 16-09-2019



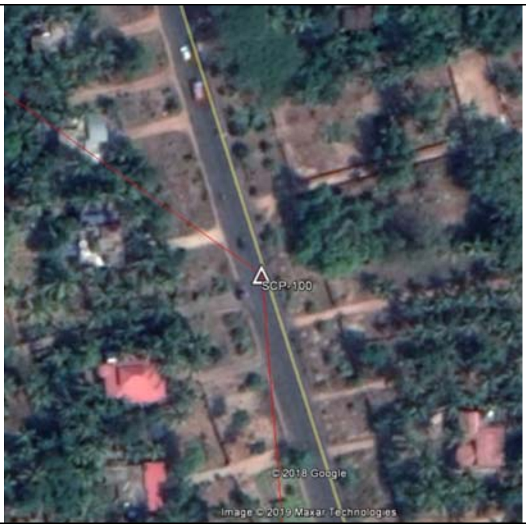
DGPS SURVEY REPORT

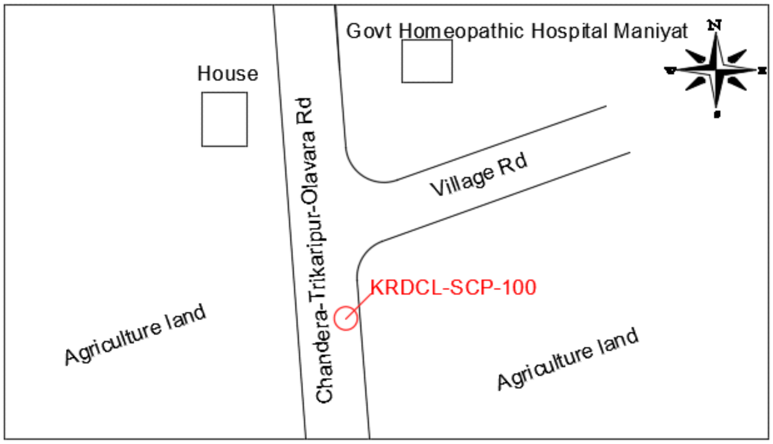
CLIENT	CONSULTANT	SURVEYED BY	DATE : 16-09-2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-100-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
12° 10' 21.70417" N	75° 10' 30.88163" E	-83.298	519064.797	1345656.243	7.159

DESCRIPTION	The survey station, KRDCL-100-SCP is marked with red and white paint and nail point on the top of the Chandhreaya-Thrikaripur-Olavara BT road. The survey station is near by government homeopathy hospital,theru natakkvu village. It is approximately 8 metres away from the electric pole.

LOCATION ON GOOGLE MAP	**FIELD PHOTOGRAPH**
	Latitude: 12.172725 Longitude: 75.17522 Elevation: 101.09m Accuracy: 1.6m Time: 09-16-2019 18:23 Note: SCP-100 Powered by NoteCam



Govt Homeopathic Hospital Maniyat
N
House
Chandera- Trikaripur-Olavara Rd
Village Rd
KRDCL-SCP-100
Agriculture land
Agriculture land

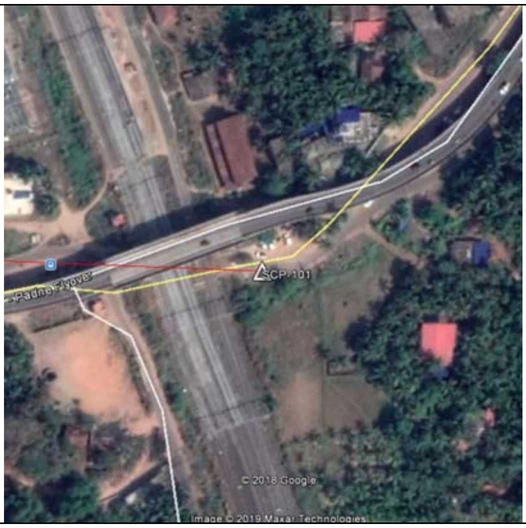
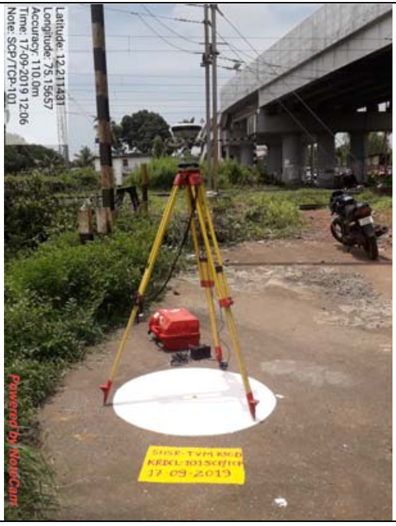
DGPS SURVEY REPORT

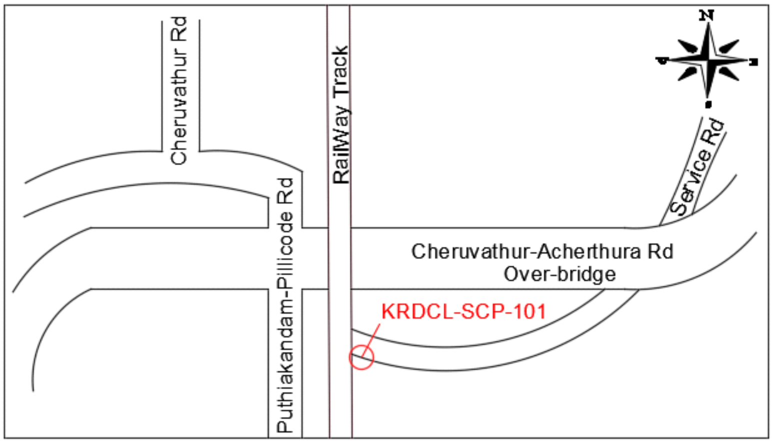
CLIENT	CONSULTANT	SURVEYED BY	DATE : 17-09-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-101-SCP/TCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
12° 12' 40.11799" N	75° 09' 22.51781" E	-85.879	516996.437	1349906.592	4.381

DESCRIPTION	The survey station, KRDCL-101-SCP/TCP is marked with white circular paint and nail point on the top of the service BT road under the Cheruvathur-Panvel over the railway bridge. The survey station is near by over bridge,cheruvathur-achanthurath. It is approximately 10 metres away from the railway track.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	



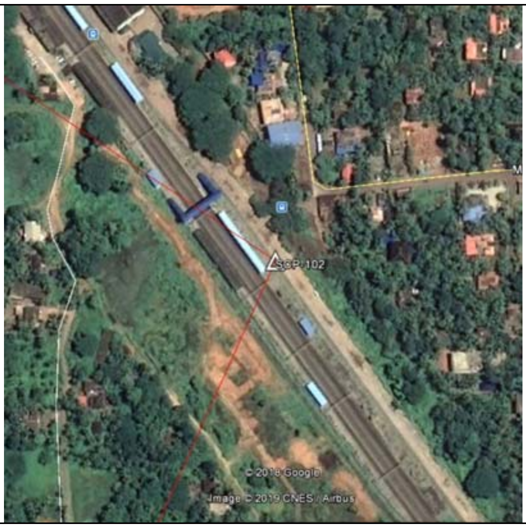
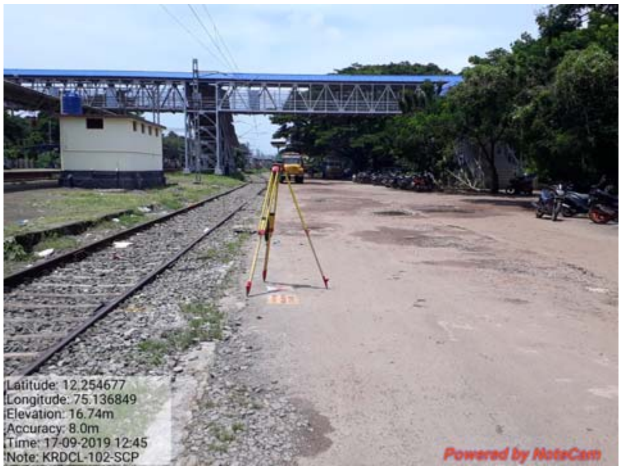
DGPS SURVEY REPORT

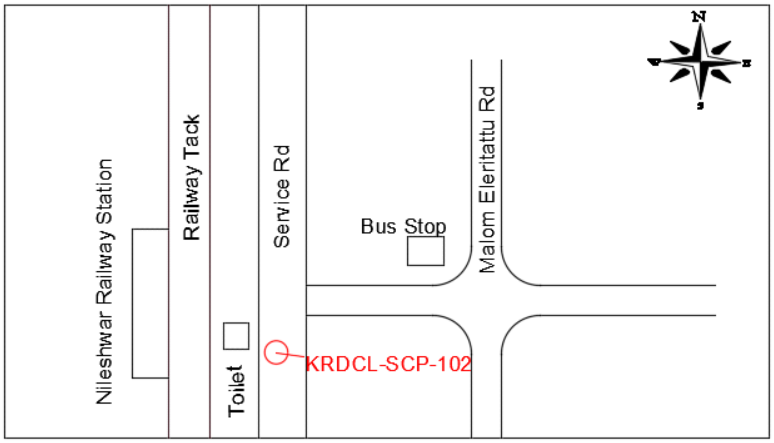
CLIENT	CONSULTANT	SURVEYED BY	DATE : 17-09-2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-102-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
12° 15' 17.12924" N	75° 08' 12.82768" E	-78.899	514888.309	1354728.323	11.168

DESCRIPTION	The survey station, KRDCL-102-SCP is marked with red and white paint and nail point on the top of the Service BT road. The survey station is near by neeleshwaram railway station. It is approximately 50 metres away from the railway station bus stop.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	 Latitude: 12.254677 Longitude: 75.136849 Elevation: 16.74m Accuracy: 8.0m Time: 17-09-2019 12:45 Note: KRDCL-102-SCP Powered by NoteCam



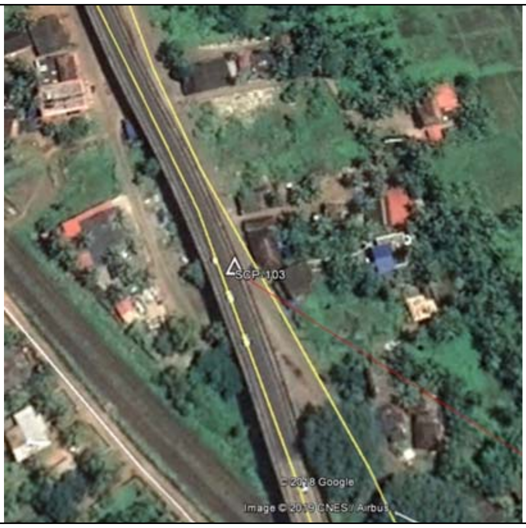
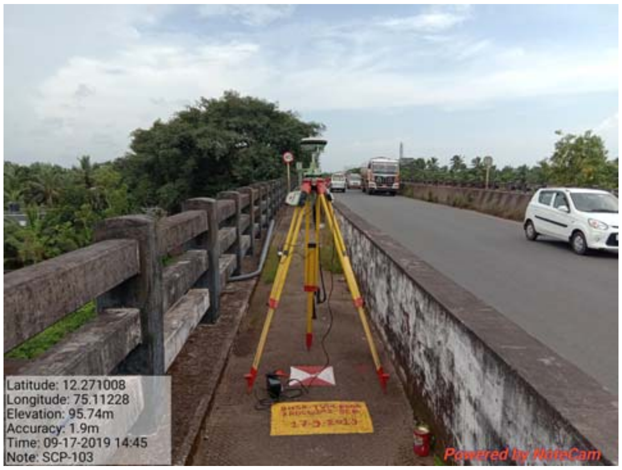
DGPS SURVEY REPORT

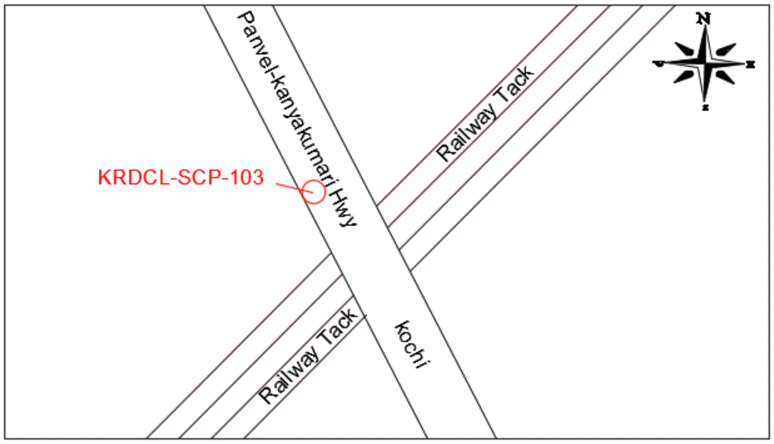
CLIENT	CONSULTANT	SURVEYED BY	DATE : 17-09-2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-103-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
12° 16' 15.44189" N	75° 06' 44.21772" E	-74.377	512210.656	1356518.263	15.633

DESCRIPTION	The survey station, KRDCL-103-SCP is marked with red and white paint and nail point on the top of the footpath,Pandankkad flyoverof Panavel-Kanniyakumari Highway BT road. The survey station is near by panvel-kanyakumari highway,pandankkad village. It is approximately 10 metres away from the speed limit signage.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	



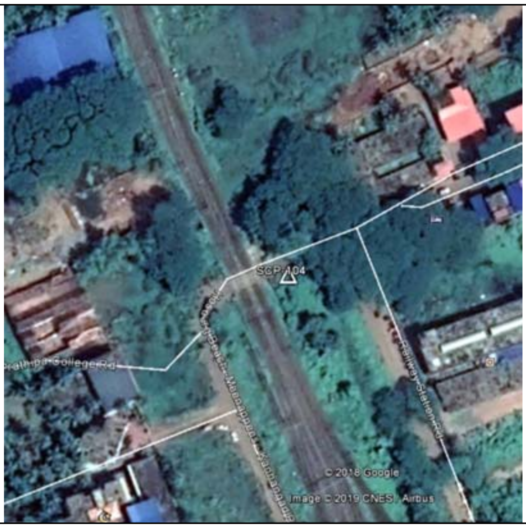
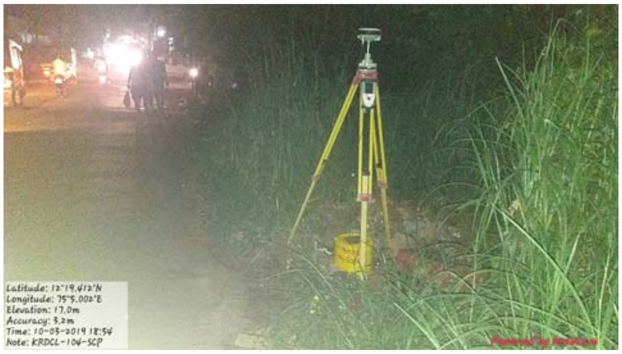
DGPS SURVEY REPORT

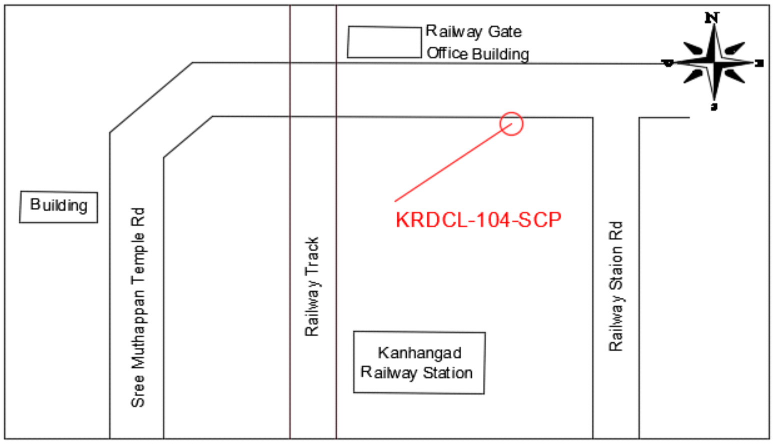
CLIENT	CONSULTANT	SURVEYED BY	DATE : 4/10/2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID
			KRDCL-104-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
12° 19' 24.81881" N	75° 05' 00.23408" E	-83.229	509067.700	1362334.178	6.689

DESCRIPTION	The survey station, KRDCL-104-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of BT road that leads to the Kanhagad railway station. The survey station is near by kanhangad railway station. It is approximately 15 metres away from the railway gate office building.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
 SCP-104 Srathipa College Rd Railway Station Rd © 2018 Google Image © 2019 CNES / Airbus	 Latitude: 12°19.412'N Longitude: 75°5.002'E Elevation: 17.0m Accuracy: 3.2m Time: 10-03-2019 18:54 Note: KRDCL-104-SCP



DGPS SURVEY REPORT

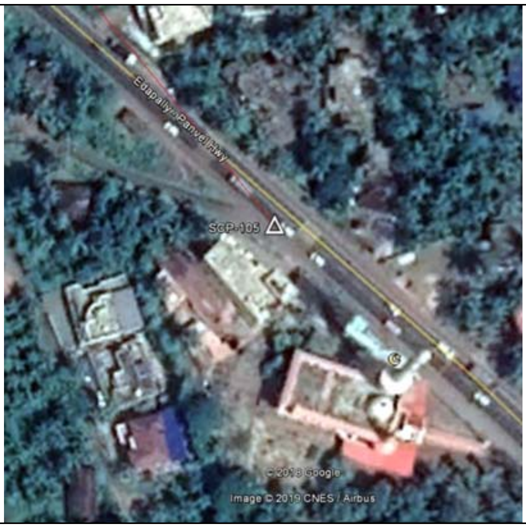
CLIENT	CONSULTANT	SURVEYED BY	DATE : 17-09-2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID KRDCL-105-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

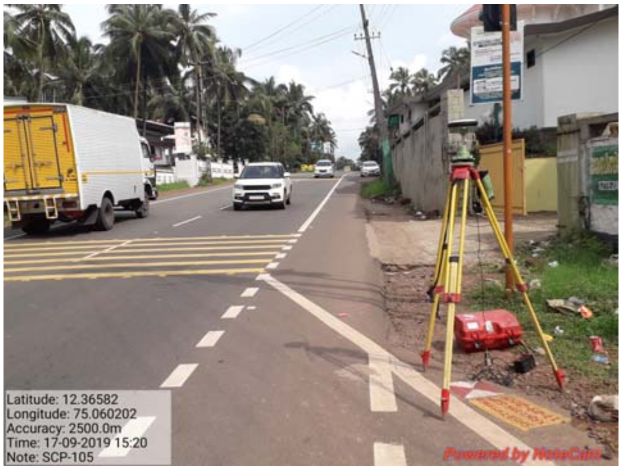
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
12° 21' 55.57175" N	75° 03' 39.03322" E	-77.797	506614.211	1366964.183	12.111

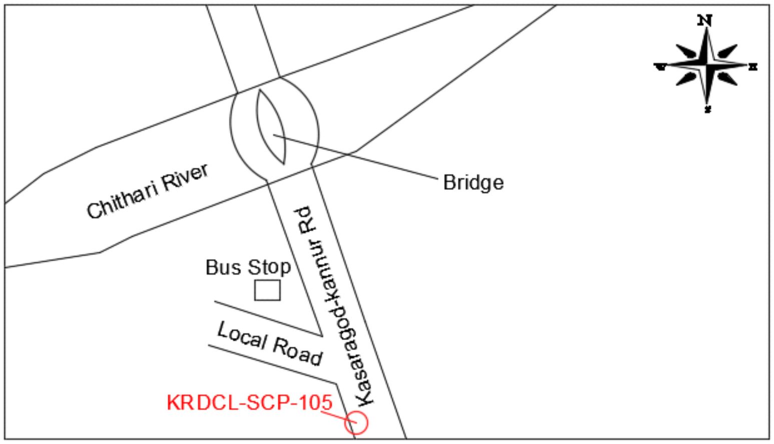
DESCRIPTION	The survey station, KRDCL-105-SCP is marked with red and white paint and nail point on the top of the Kasargod-Kannur BT road. The survey station is near by azeeziya arabic college. It is approximately 1 metres away from the traffic signal.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





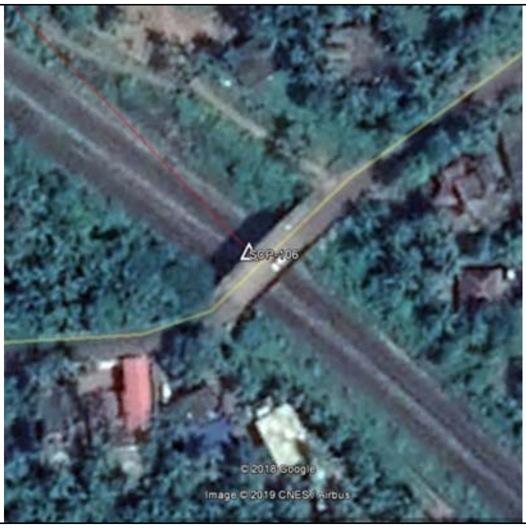
DGPS SURVEY REPORT

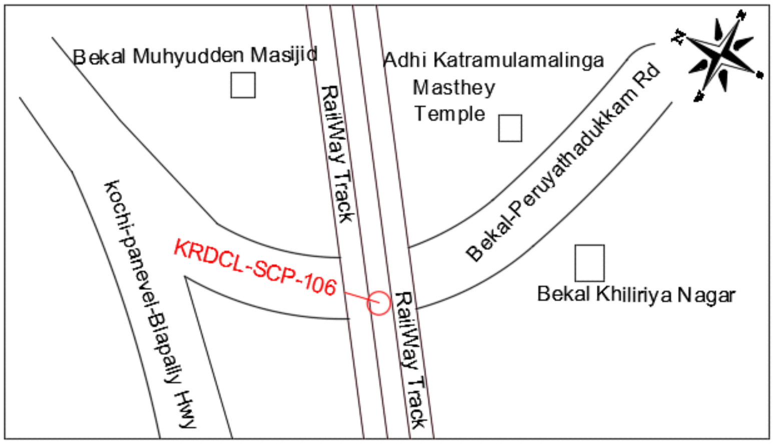
CLIENT	CONSULTANT	SURVEYED BY	DATE : 17-09-2019
			DGPS POINT ID
			KRDCL-106-SCP/TCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
12° 24' 01.62335" N	75° 01' 59.09175" E	-72.300	503595.769	1370835.577	17.717

DESCRIPTION	The survey station, KRDCL-106-SCP/TCP is marked with white circular paint and nail point on the top of the over the railway bridge of Bekal--Periyathadukkam Road, near Bekal Town. The survey station is near by illyas juma masjid,kheleniya village. It is approximately 30 metres away from the adhi katrumula malingamasthery temple.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	



DGPS SURVEY REPORT

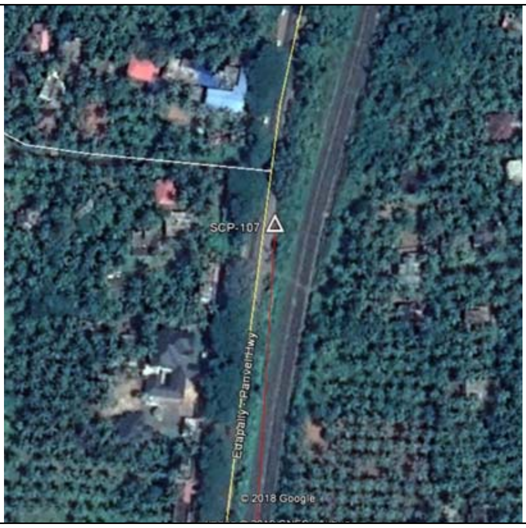
CLIENT	CONSULTANT	SURVEYED BY	DATE : 17-09-2019
			DGPS POINT ID
			KRDCL-107-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

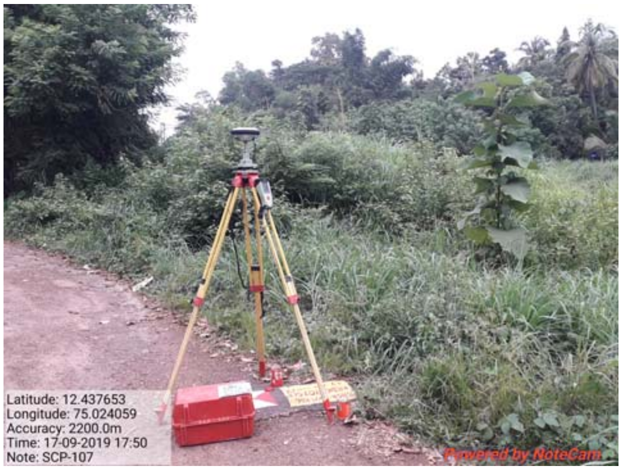
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
12° 26' 04.47881" N	75° 01' 25.69781" E	-69.892	502587.160	1374609.228	20.199

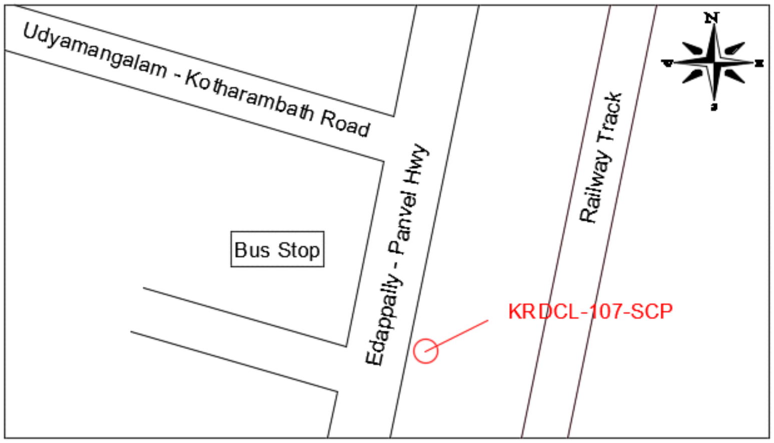
DESCRIPTION	The survey station, KRDCL-107-SCP is marked with red and white paint and nail point on the top of the Edappally-Panavel BT road. The survey station is near by puthiyaram bus stop. It is approximately 8 metres away from the railway track.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





DGPS SURVEY REPORT

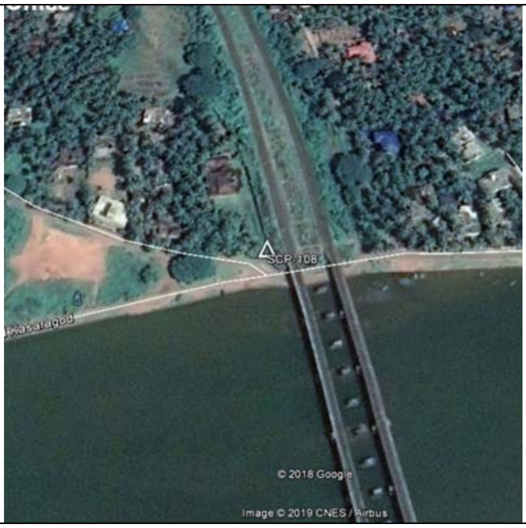
CLIENT	CONSULTANT	SURVEYED BY	DATE : 4/10/2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-108-SCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

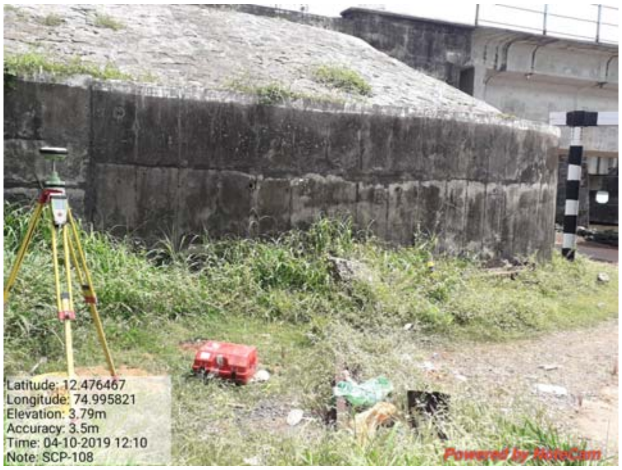
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	MSL HEIGHT(m)
12° 28' 35.38443" N	74° 59' 45.12183" E	-87.763	499550.910	1379244.504	2.379

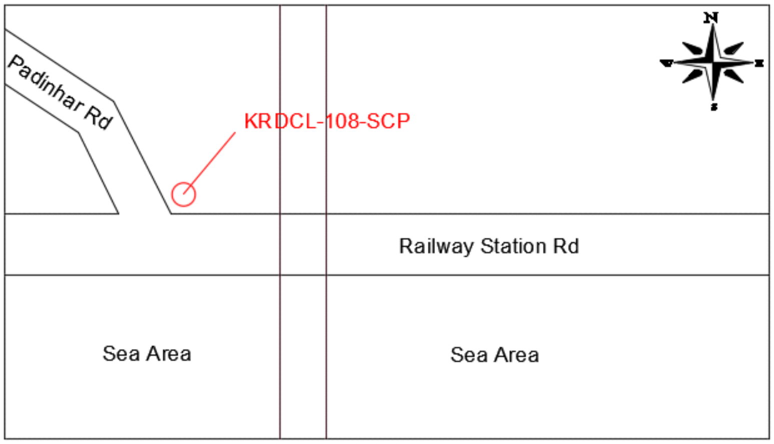
DESCRIPTION	The survey station, KRDCL-108-SCP is marked with a plus sign engraved on a metal plate on the top of the pillar. The pillar is erected on the side of Kasargod beach road. The survey station is near by kasargod road. It is approximately 8 metres away from the railway track.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





DGPS SURVEY REPORT

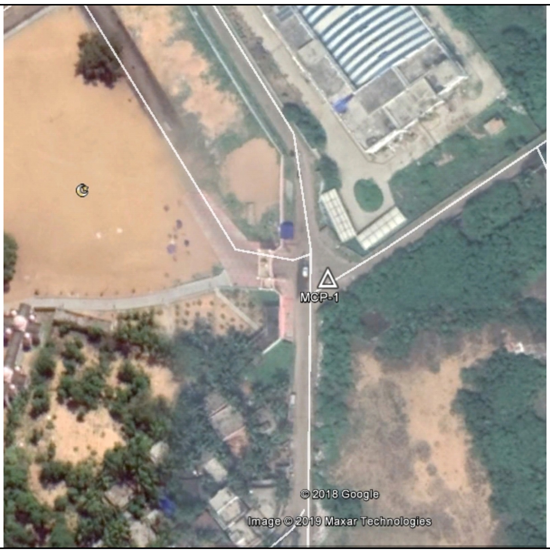
CLIENT	CONSULTANT	SURVEYED BY	DATE : 14-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-01-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

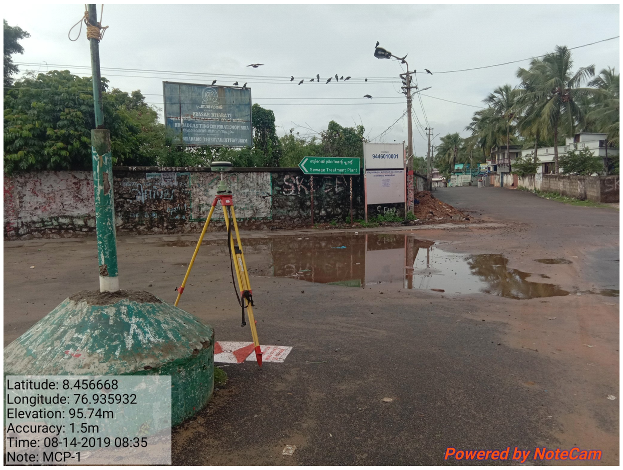
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
8° 27' 23.87848" N	76° 56' 09.62072" E	-92.169	713141.204	935309.608	4.811

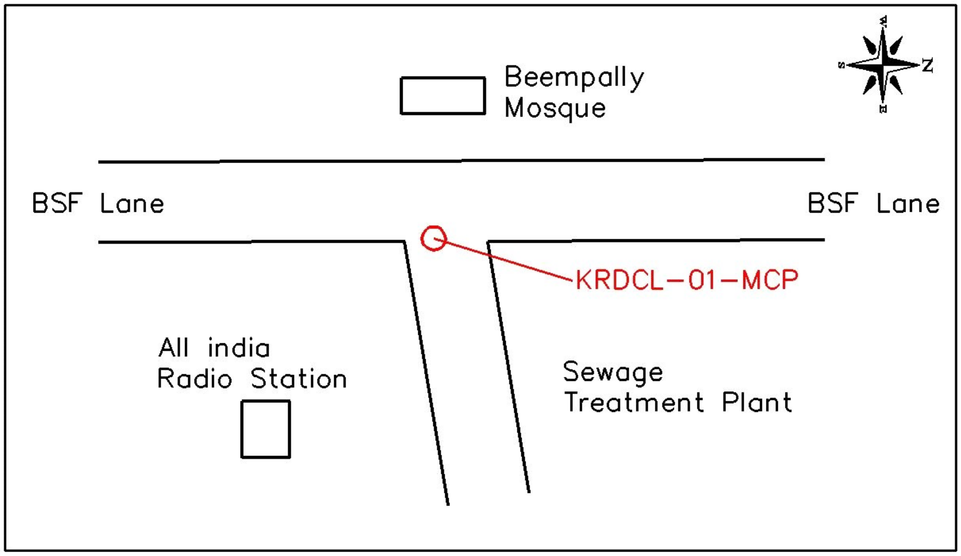
DESCRIPTION	The survey station, KRDCL-01-MCP is marked with red and white paint and nail point on the top of BSF lane BT road. The survey station is near by Bemapally mosque. It is approximately 2 metres away from the flag Pole.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





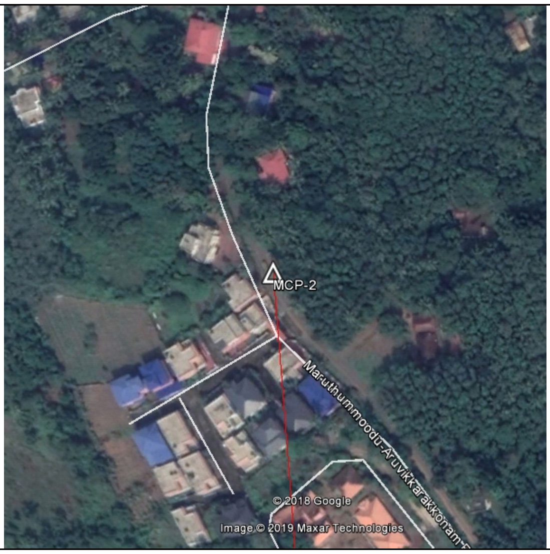
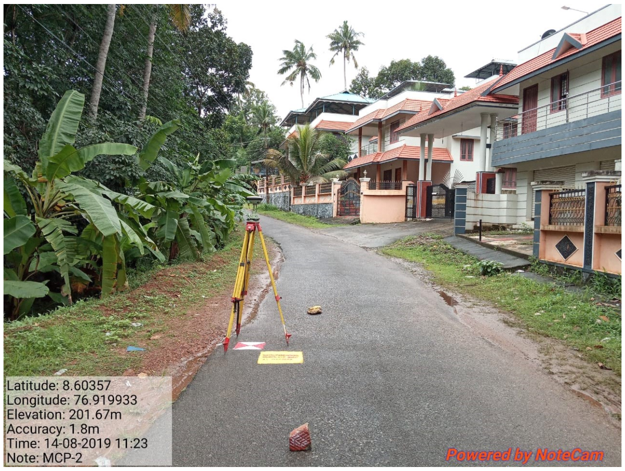
DGPS SURVEY REPORT

CLIENT	CONSULTANT	SURVEYED BY	DATE : 14-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-02-MCP

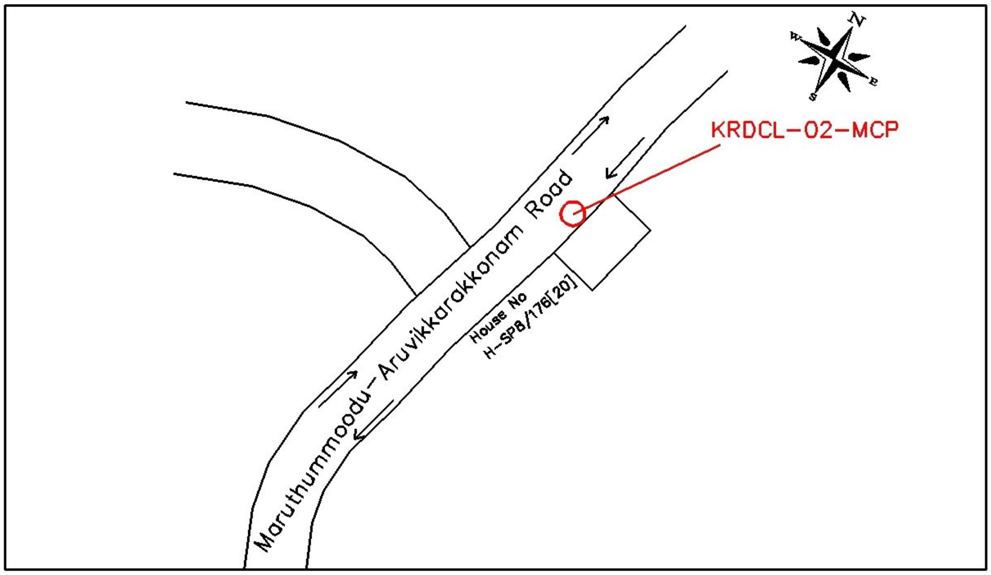
PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
8° 36' 12.71456" N	76° 55' 11.98603" E	6.623	711297.215	951549.991	103.465

DESCRIPTION	The survey station, KRDCL-02-MCP is marked with red and white paint and nail point on the top of Maruthumoodu-Aruvikarakonam BT road . The survey station is near by Residential House no: SP8/176(20). It is approximately 8 metres away from the road junction.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	

MCP-2
Maruthummoodu-Aruvikkarakkonam-R
© 2018 Google
Image © 2019 Maxar Technologies



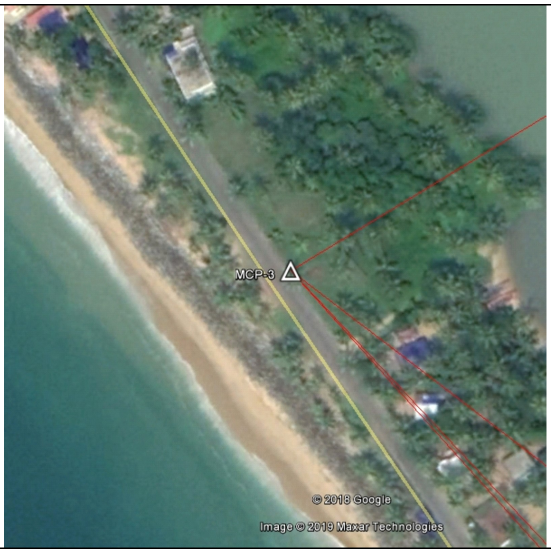
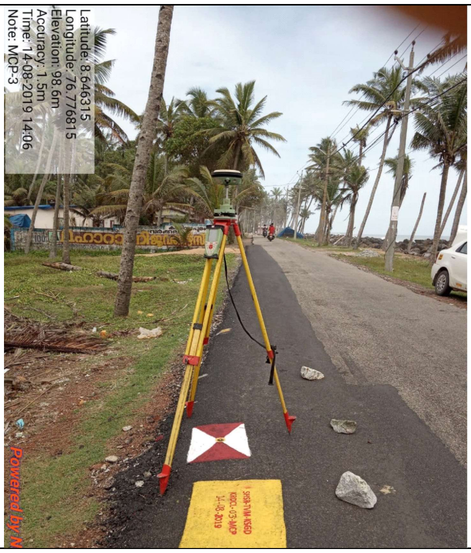
DGPS SURVEY REPORT

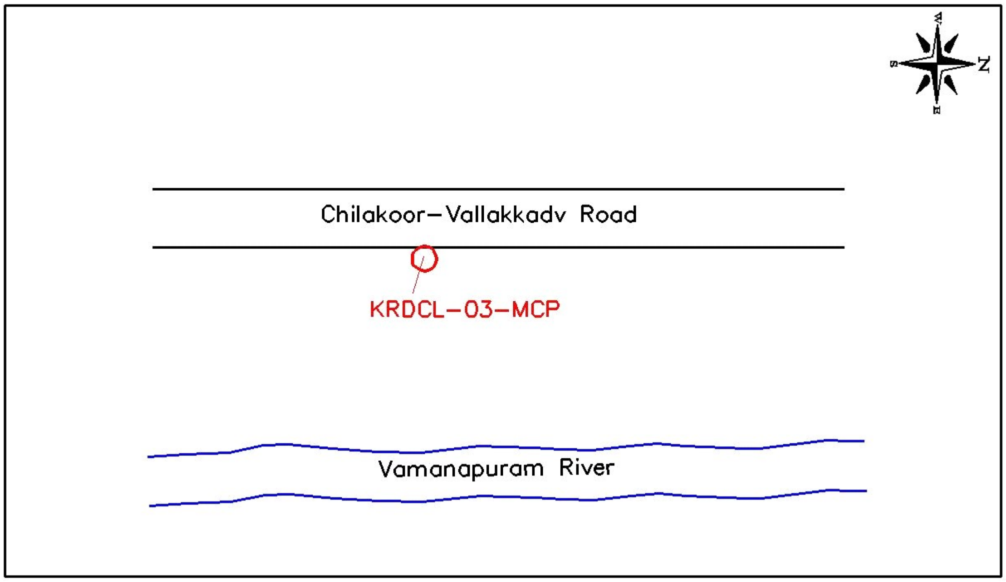
CLIENT	CONSULTANT	SURVEYED BY	DATE : 14-08-2019
			DGPS POINT ID
			KRDCL-03-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
8° 38' 46.60508" N	76° 46' 36.62521" E	-93.204	695515.749	956202.028	3.653

DESCRIPTION	The survey station, KRDCL-03-MCP is marked with red and white paint and nail point on the top of Chillaroor-Vallakada BT road . The survey station is parallel Mutalapozhi river in Thazhampalli. It is approximately 14 metres away from the electric pole.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	 Latitude: 8.646315 Longitude: 76.776815 Elevation: 98.6m Accuracy: 1.5m Time: 14-08-2019 14:06 Note: MCP-3 Powered by N



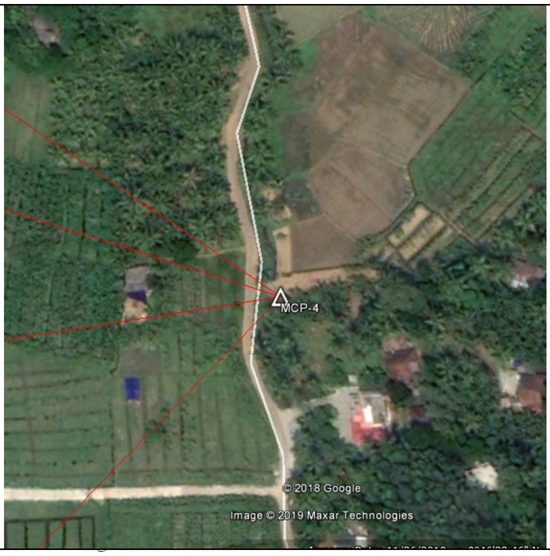
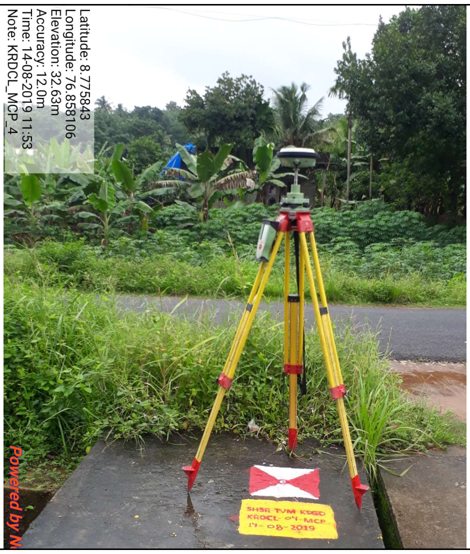
DGPS SURVEY REPORT

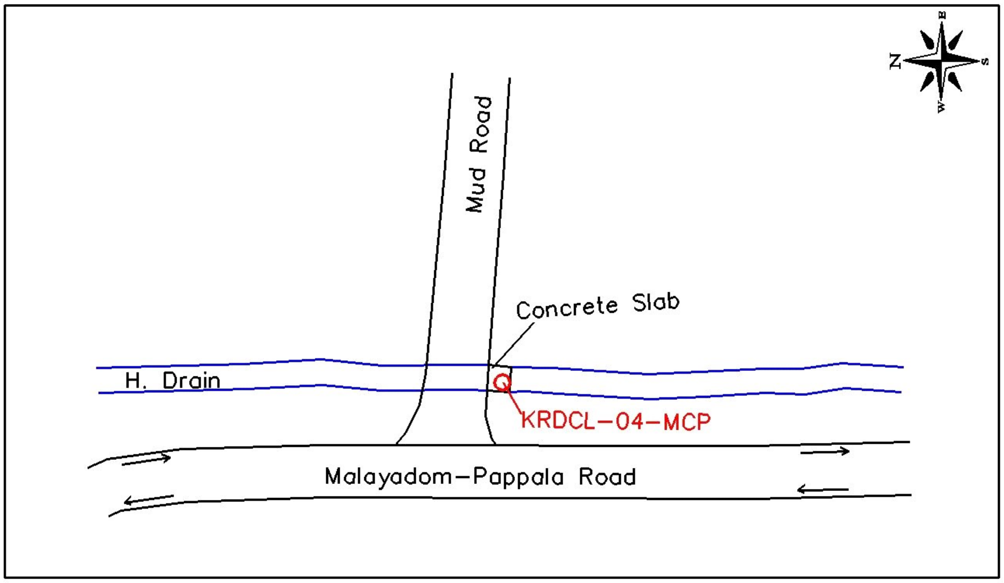
CLIENT	CONSULTANT	SURVEYED BY	DATE : 14-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID
			KRDCL-04-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
8° 46' 32.85293" N	76° 51' 29.18127" E	-73.259	704390.419	970570.343	23.321

DESCRIPTION	The survey station, KRDCL-04-MCP is marked with red and white paint and nail point on the top of concrete slab covering a drain on the side of the Malayodam-Pappala BT road. The survey station is near by drain to the side of Malayamadom-Pappla Road. It is approximately 22 metres away from the telephone pole.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	 Latitude: 8.775843 Longitude: 76.858106 Elevation: 32.63m Accuracy: 12.0m Time: 14-08-2019 11:53 Note: KRDCL_MCP_4 SHSR-TVM-KSGD KRDCL-04-MCP 14-08-2019 Powered by N



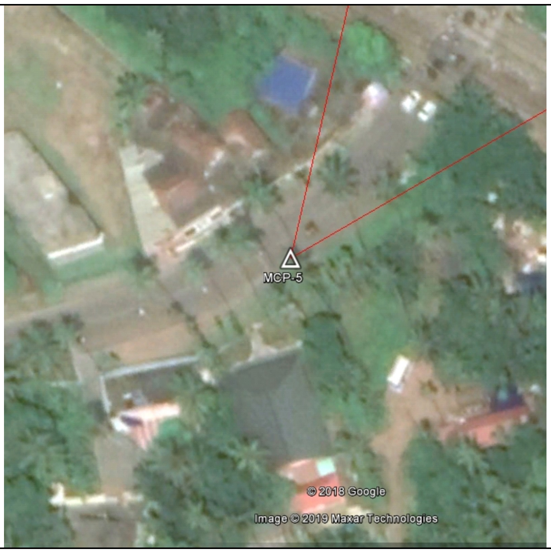
DGPS SURVEY REPORT

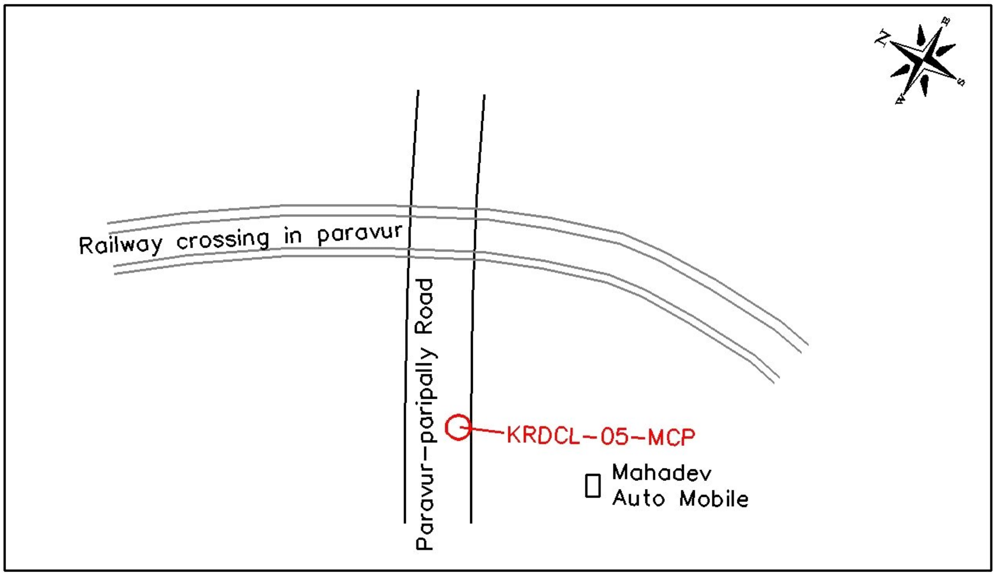
CLIENT KRDCL	CONSULTANT SYSTRA	SURVEYED BY GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DATE : 14-08-2019 DGPS POINT ID KRDCL-05-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
8° 48' 45.58120" N	76° 40' 29.44742" E	-92.113	684207.962	974553.220	4.376

DESCRIPTION	The survey station, KRDCL-05-MCP is marked with red and white paint and nail point on the top of road . The survey station is near by railway cross on the Parapally-Paravur road. It is approximately 13 metres away from the Mahadev automobile.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	Latitude: 8.812648 Longitude: 76.674829 Elevation: 7.45m Accuracy: 4.0m Time: 13-08-2019 15:34 Note: KRDCL-MCP-5 Powered by N



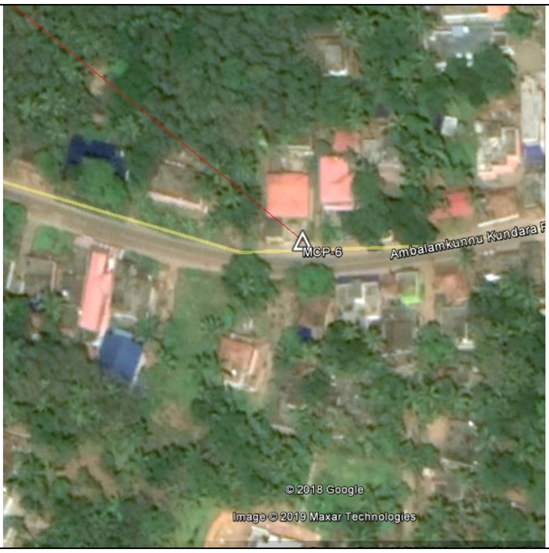
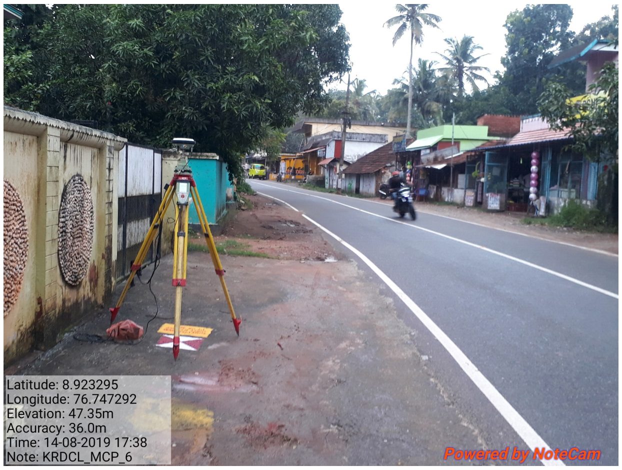
DGPS SURVEY REPORT

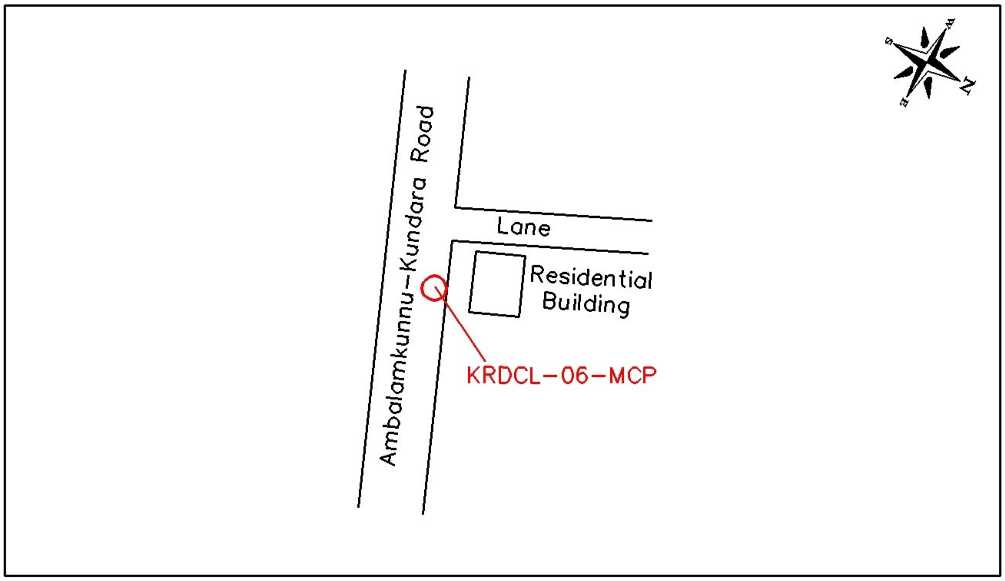
CLIENT	CONSULTANT	SURVEYED BY	
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DATE : 14-08-2019
			DGPS POINT ID
			KRDCL-06-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
8° 55' 23.77364" N	76° 44' 50.71556" E	-58.994	692134.854	986823.756	37.347

DESCRIPTION	The survey station, KRDCL-06-MCP is marked with red and white paint and nail point on the top of Ambalakunnu-Kundara BT Road . The survey station is near by Nedumankavu - Veliyam Road. It is approximately 6 metres away from the electric pole.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
 MCP-6 Ambalamkunnu Kundara R © 2018 Google Image © 2019 Maxar Technologies	 Latitude: 8.923295 Longitude: 76.747292 Elevation: 47.35m Accuracy: 36.0m Time: 14-08-2019 17:38 Note: KRDCL_MCP_6 Powered by NoteCam



DGPS SURVEY REPORT

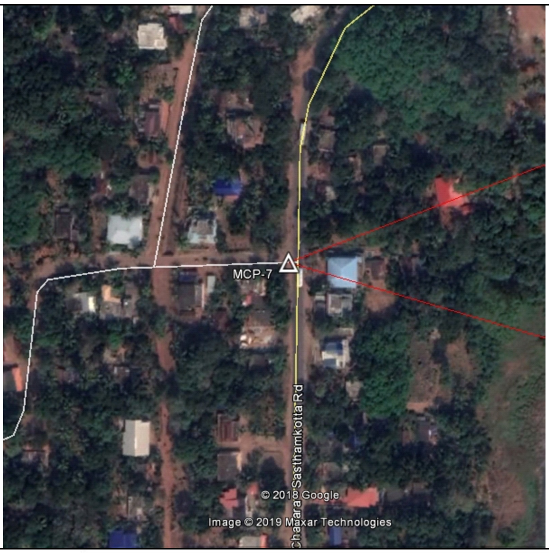
CLIENT	CONSULTANT	SURVEYED BY	DATE : 14-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID
			KRDCL-07-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

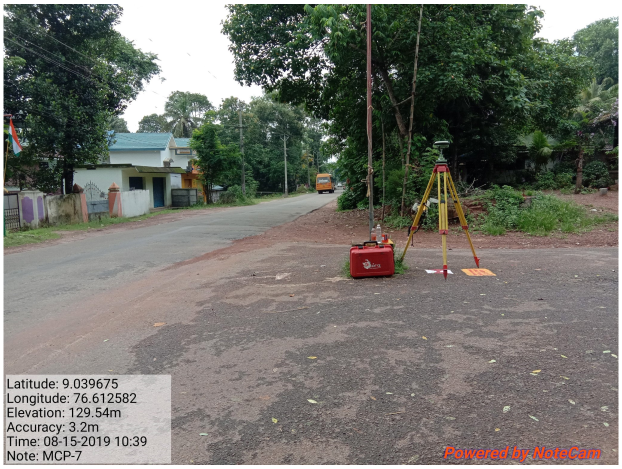
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
9° 02' 22.77509" N	76° 36' 45.15172" E	-74.868	677243.985	999628.814	20.987

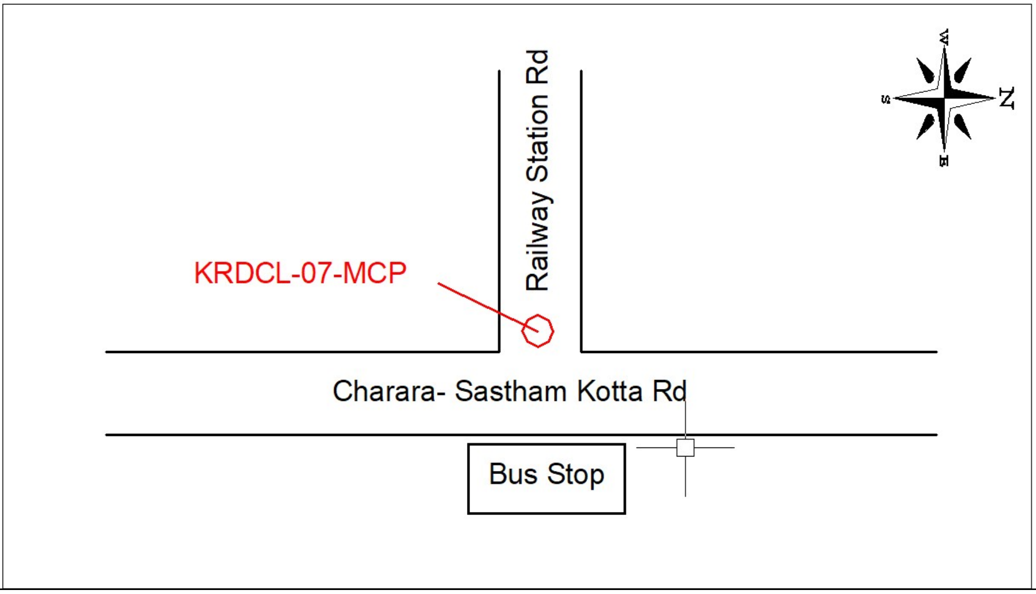
DESCRIPTION	The survey station, KRDCL-07-MCP is marked with red and white paint and nail point on the top of Railway staion BT road that leads to the ICS junction railway station. The survey station is near by Chavara - Sasthamkotta Road. It is approximately 1 metres away from the flag Pole.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





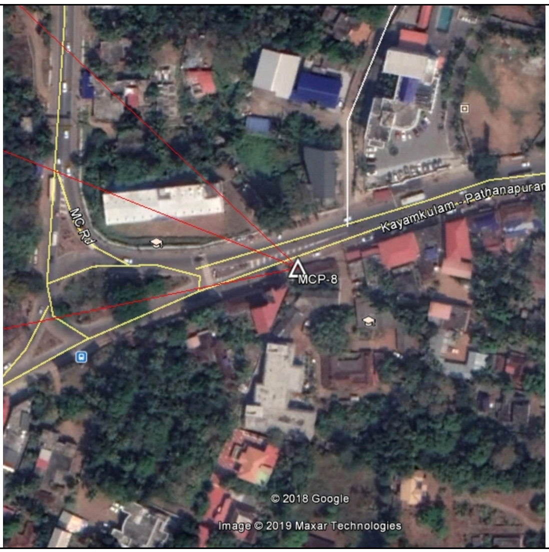
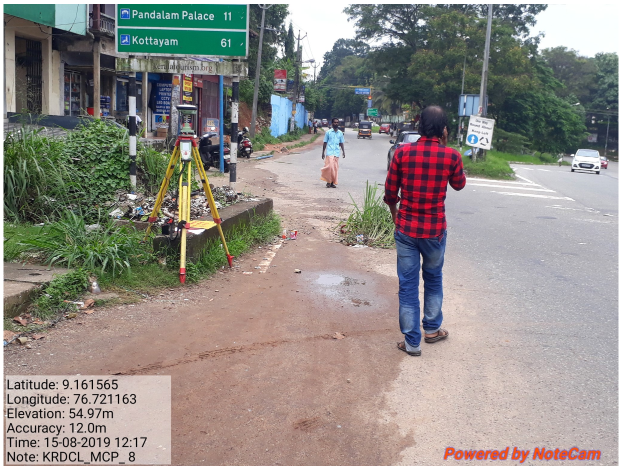
DGPS SURVEY REPORT

CLIENT KRDCL	CONSULTANT SYSTRA	SURVEYED BY GEO KNO	DATE : 14-08-2019
			DGPS POINT ID
			KRDCL-08-MCP

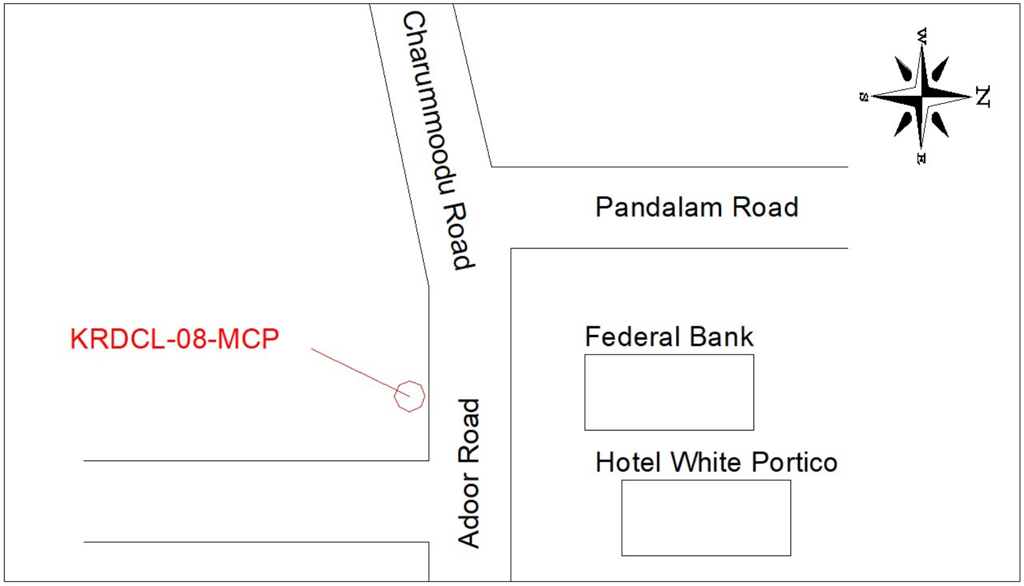
PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
9° 09' 41.60064" N	76° 43' 16.00636" E	-50.058	689116.882	1013165.762	45.903

DESCRIPTION	The survey station, KRDCL-08-MCP is marked with red and white paint and nail point on the top of culvert to the side of the Adoor-Charrumoodu BT road. The survey station is near by Adoor Federal bank. It is approximately 1.5 metres away from the flag Pole.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	

Latitude: 9.161565
Longitude: 76.721163
Elevation: 54.97m
Accuracy: 12.0m
Time: 15-08-2019 12:17
Note: KRDCL_MCP_8



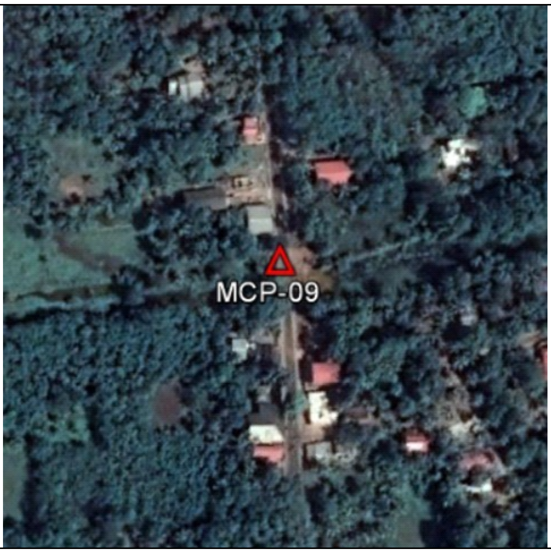
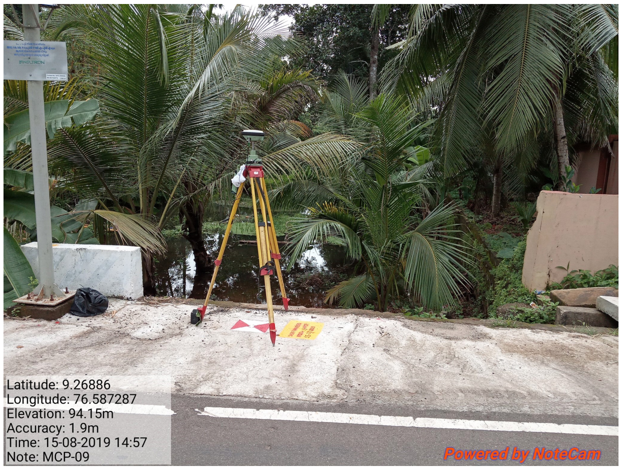
DGPS SURVEY REPORT

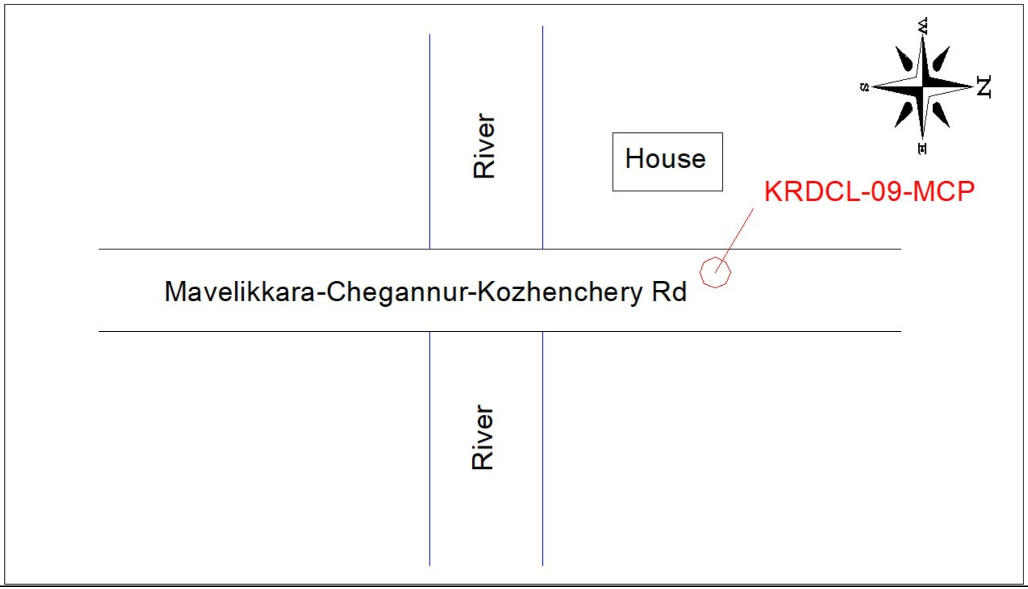
CLIENT	CONSULTANT	SURVEYED BY	DATE : 15-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-09-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
9° 16' 07.89950" N	76° 35' 14.17187" E	-89.622	674353.732	1024965.979	5.907

DESCRIPTION	The survey station, KRDCL-09-MCP is marked with red and white paint and nail point on the top of Mavellikara-Chengannur-Kozhelchery BT Road . The survey station is near by bridge on SH10 in Cheriyanad. It is approximately 31 metres away from the Ponni Stores.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	 Latitude: 9.26886 Longitude: 76.587287 Elevation: 94.15m Accuracy: 1.9m Time: 15-08-2019 14:57 Note: MCP-09 Powered by NoteCam



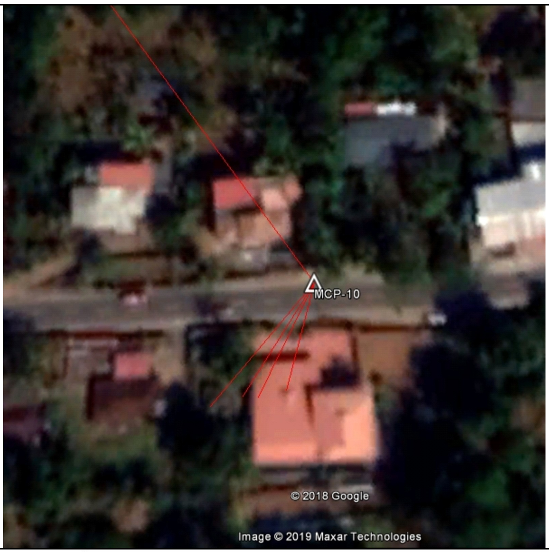
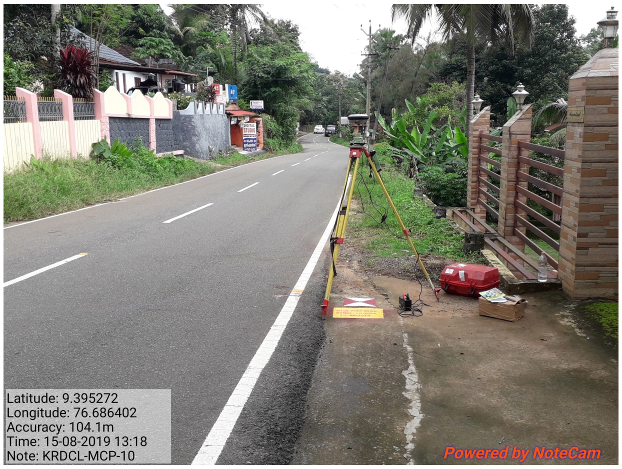
DGPS SURVEY REPORT

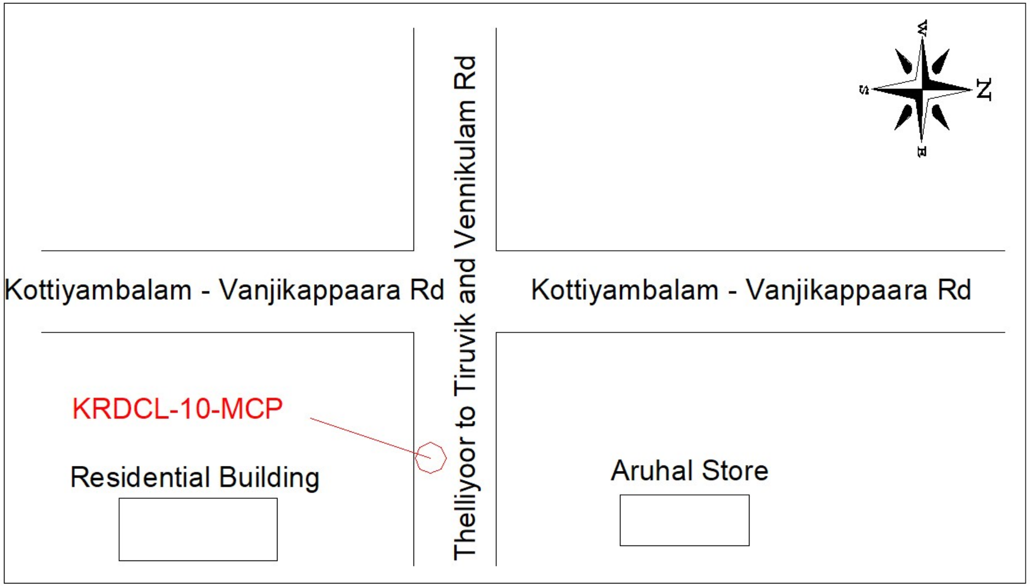
CLIENT	CONSULTANT	SURVEYED BY	DATE : 15-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID
			KRDCL-10-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
9° 23' 43.34681" N	76° 41' 12.16972" E	-59.117	685213.252	1039009.253	36.724

DESCRIPTION	The survey station, KRDCL-10-MCP is marked with red and white paint and nail point on the top of BT road . The survey station is near by residential bulding on the side of Podippara - Nellimala Road. It is approximately 200 metres away from the Government Hospital.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	 Latitude: 9.395272 Longitude: 76.686402 Accuracy: 104.1m Time: 15-08-2019 13:18 Note: KRDCL-MCP-10 Powered by NoteCam



W
S
N
E
Thelliyoor to Tiruvik and Vennikulam Rd
Kottiyambalam - Vanjikappaara Rd
Kottiyambalam - Vanjikappaara Rd
KRDCL-10-MCP
Residential Building
Aruhal Store

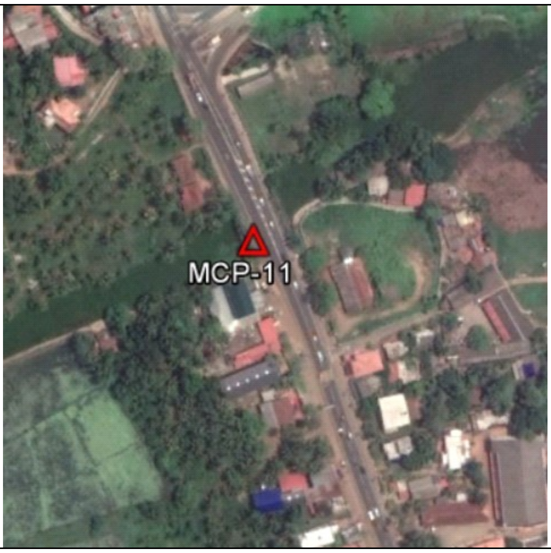
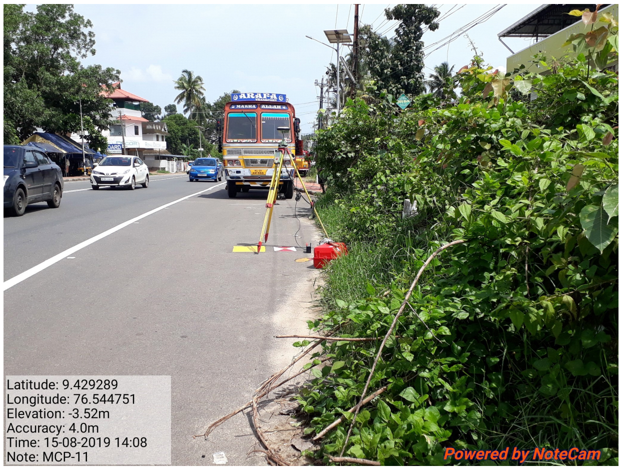
DGPS SURVEY REPORT

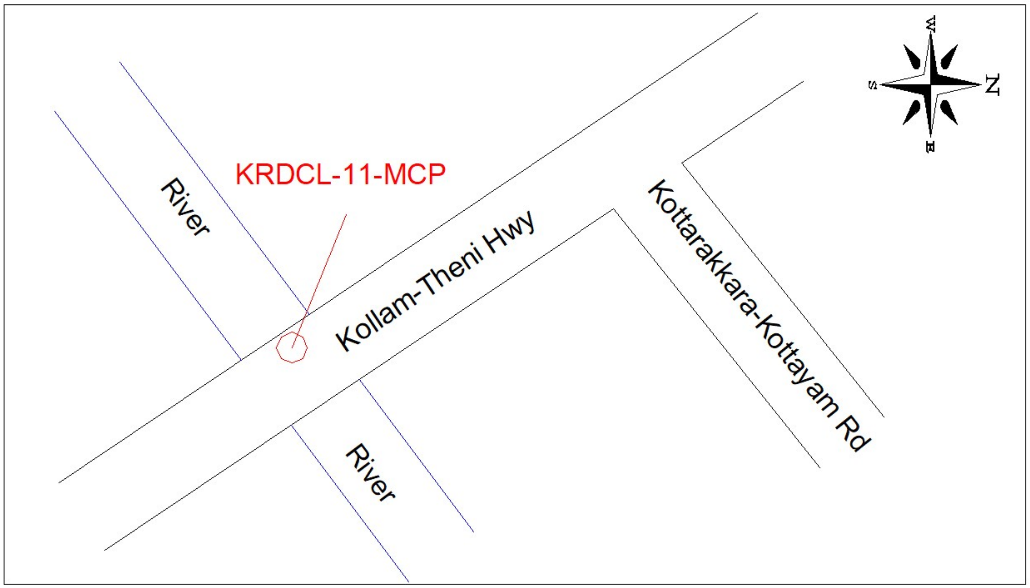
CLIENT	CONSULTANT	SURVEYED BY	DATE : 15-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-11-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
9° 25' 45.32696" N	76° 32' 40.99547" E	-90.515	669601.127	1042684.875	5.024

DESCRIPTION	The survey station, KRDCL-11-MCP is marked with red and white paint and nail point on the top of Kollam-Theni highway BT road . The survey station is near by Perunna bus stop. It is approximately 13 metres away from the solar powered Lamp post.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	 Latitude: 9.429289 Longitude: 76.544751 Elevation: -3.52m Accuracy: 4.0m Time: 15-08-2019 14:08 Note: MCP-11 Powered by NoteCam



DGPS SURVEY REPORT

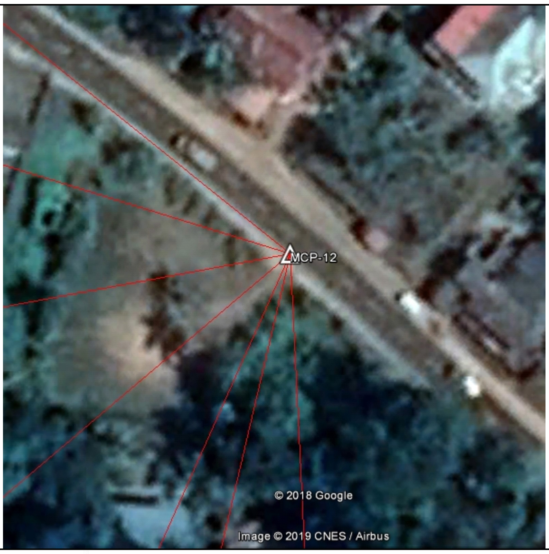
CLIENT	CONSULTANT	SURVEYED BY	DATE : 15-08-2019
			DGPS POINT ID
			KRDCL-12-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

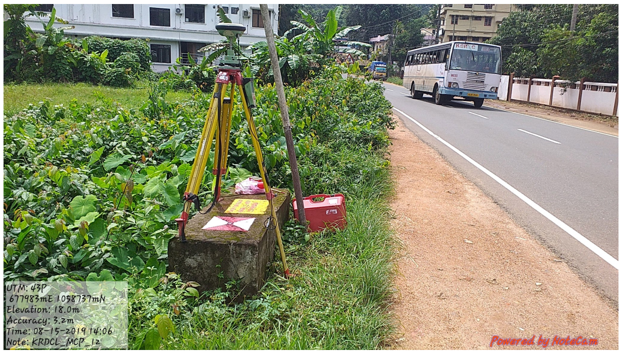
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
9° 34' 26.65358" N	76° 37' 18.07719" E	-75.528	677978.904	1058739.819	20.266

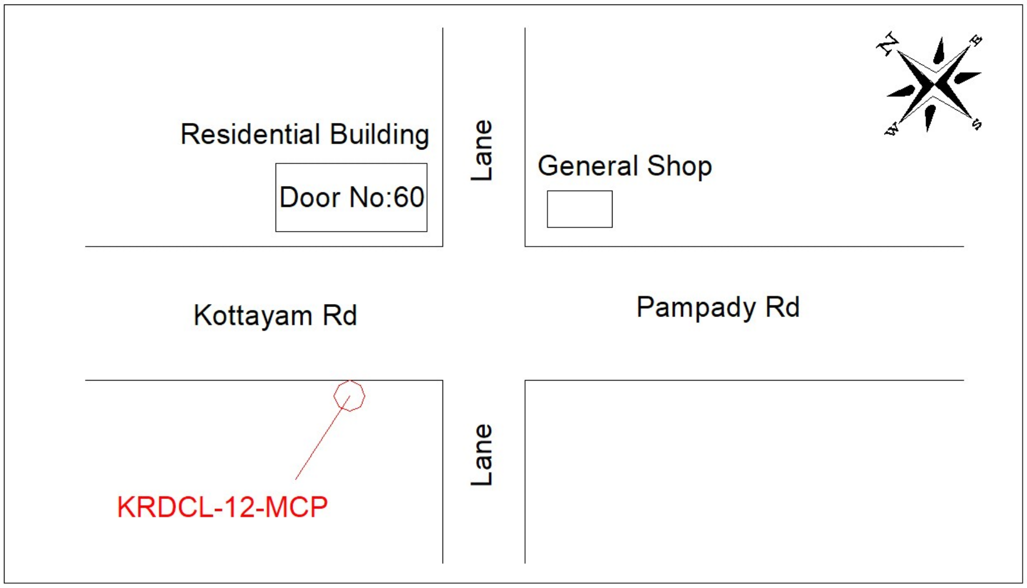
DESCRIPTION	The survey station, KRDCL-12-MCP is marked with red and white paint and nail point on the top of culvert on the side of Kottayam-Pambady BT road. The survey station is near by Residential House no: 60 in Pampady village. It is approximately 1 metres away from the wooden telephone pole.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





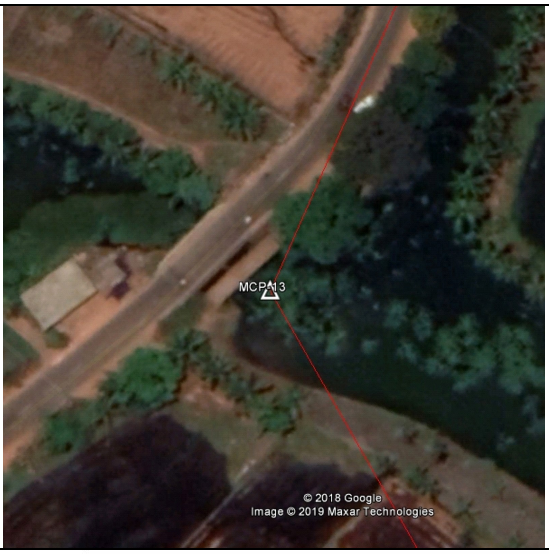
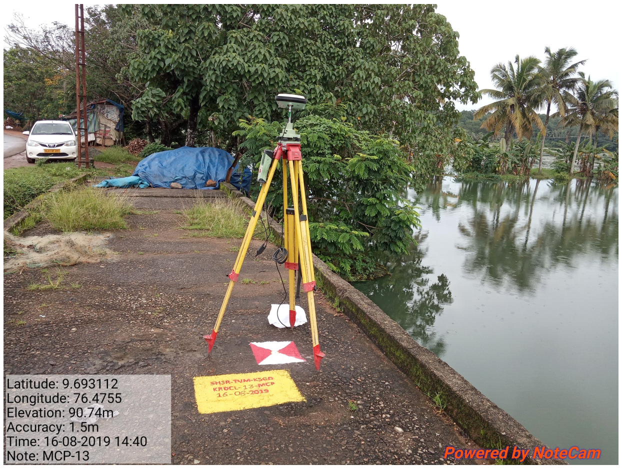
DGPS SURVEY REPORT

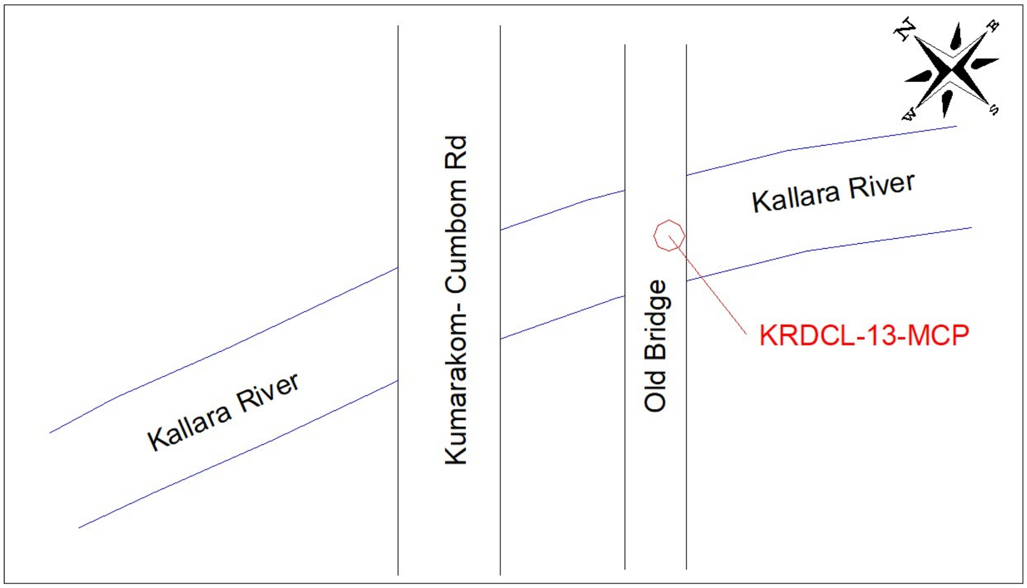
CLIENT	CONSULTANT	SURVEYED BY	DATE : 15-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-13-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
9° 41' 35.17983" N	76° 28' 31.88151" E	-92.460	661877.078	1071832.473	3.096

DESCRIPTION	The survey station, KRDCL-13-MCP is marked with red and white paint and nail point on the top of the old bridge on top of Kallara river Parallel to Kumarakonam-Cumbom BT road. The survey station is near by Kallara river bridge in Perumthuruth. It is approximately 18 metres away from the electric pole.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	 Latitude: 9.693112 Longitude: 76.4755 Elevation: 90.74m Accuracy: 1.5m Time: 16-08-2019 14:40 Note: MCP-13 SHSR-TVM-KSGD KRDCL-13-MCP 16-08-2019 Powered by NoteCam



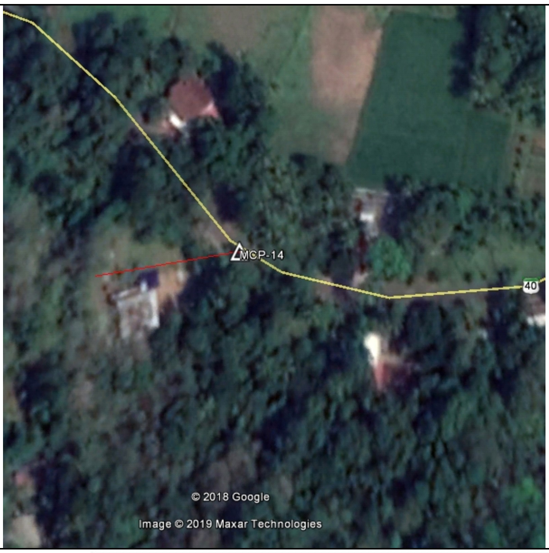
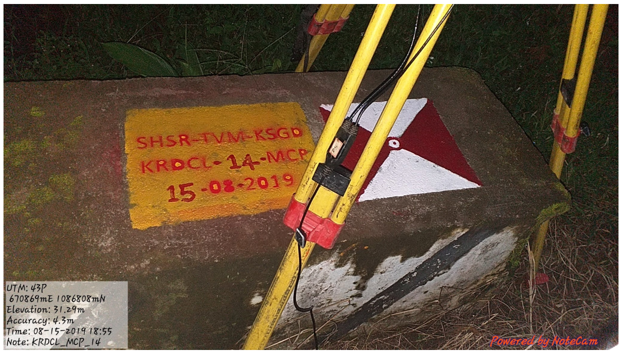
DGPS SURVEY REPORT

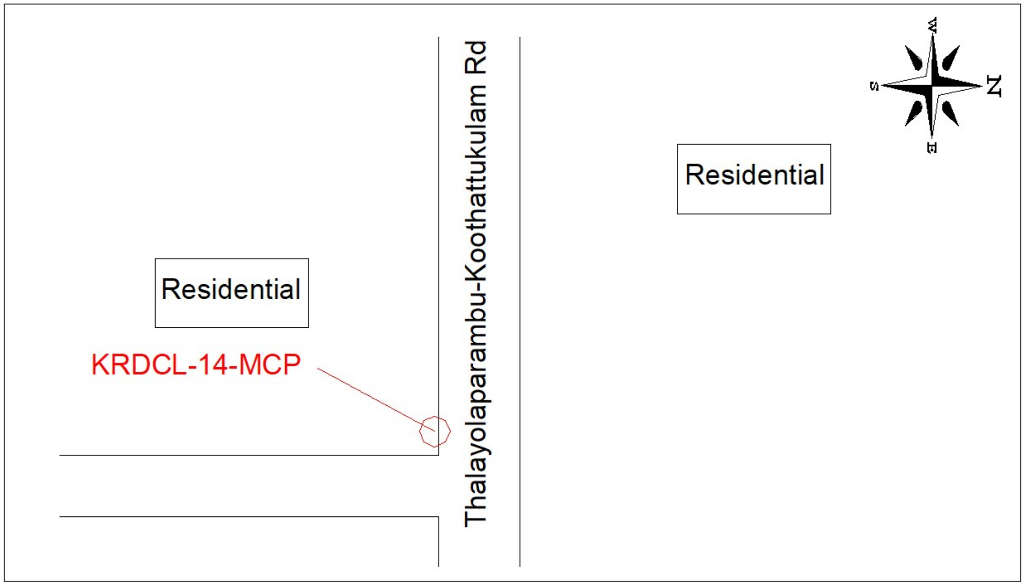
CLIENT	CONSULTANT	SURVEYED BY	DATE : 15-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-14-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
9° 49' 41.33029" N	76° 33' 29.11278" E	-78.051	670868.251	1086808.590	17.655

DESCRIPTION	The survey station, KRDCL-14-MCP is marked with red and white paint and nail point on the top of culvert on the side of the Thalayolaparambu-Koothattukulam BT road. The survey station is near by Residential building in Muttathupuram. It is approximately 2 metres away from the telephone pole.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
 MCP-14 40 © 2018 Google Image © 2019 Maxar Technologies	 SHSR-TVM-KSGD KRDCL-14-MCP 15-08-2019 UTM: 43P 670869mE 1086808mN Elevation: 31.29m Accuracy: 4.3m Time: 08-15-2019 18:55 Note: KRDCL_MCP_14 Powered by NoteCam



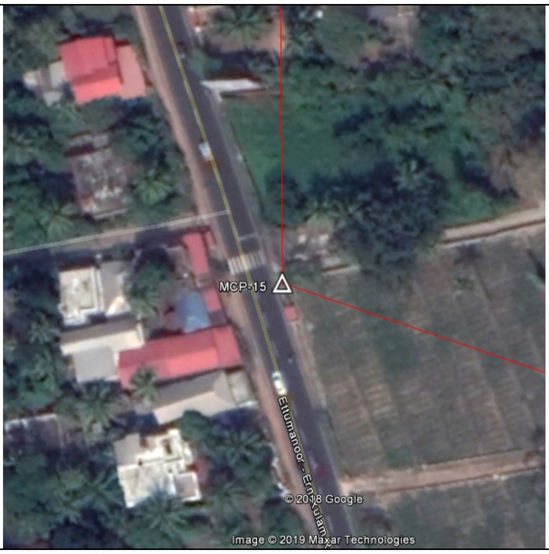
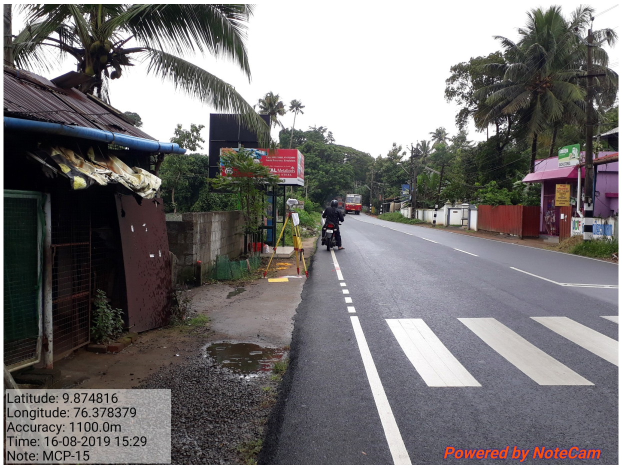
DGPS SURVEY REPORT

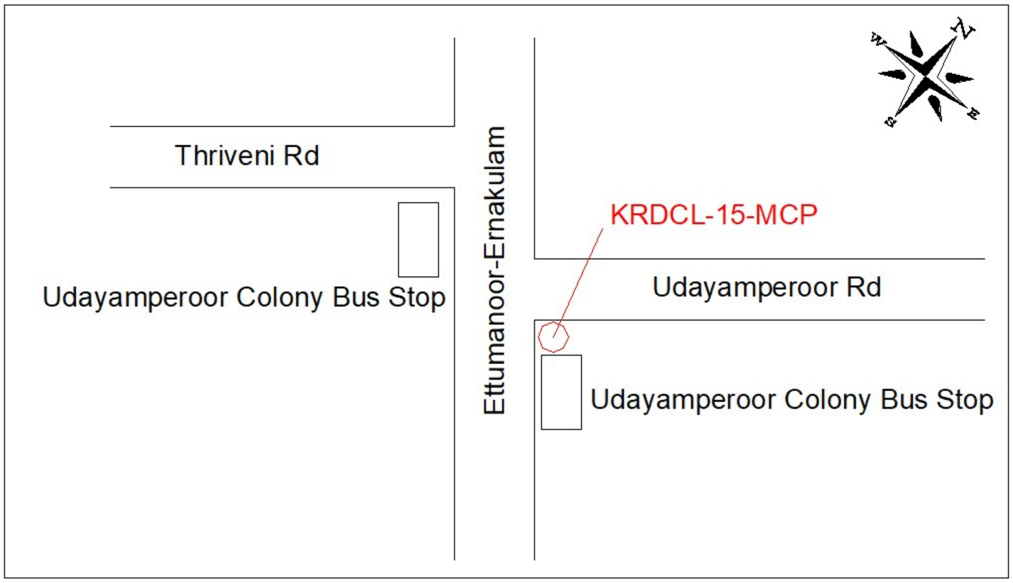
CLIENT	CONSULTANT	SURVEYED BY	DATE : 16-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-15-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
9° 52' 40.42680" N	76° 22' 37.83494" E	-90.515	651002.129	1092223.695	4.964

DESCRIPTION	The survey station, KRDCL-15-MCP is marked with red and white paint and nail point to the side of the junction between the Ettmanoor-Ernakulam BT Road and Udayamperoor BT Road . The survey station is near by Udayamperamboor colony Bus Stop. It is approximately 8 metres away from the Sachu stores.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
 MCP-15 Ettumanoor - Ernakulam © 2018 Google Image © 2019 Maxar Technologies	 Latitude: 9.874816 Longitude: 76.378379 Accuracy: 1100.0m Time: 16-08-2019 15:29 Note: MCP-15 Powered by NoteCam



DGPS SURVEY REPORT

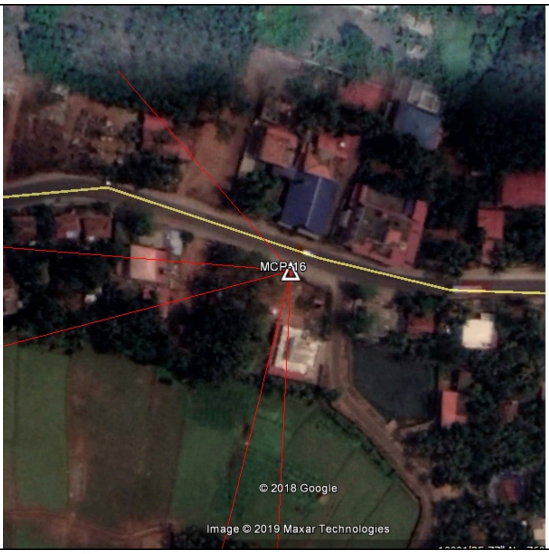
CLIENT	CONSULTANT	SURVEYED BY	DATE : 16-08-2019
KRDCL	SYSTRA	GEOKNO	DGPS POINT ID
			KRDCL-16-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

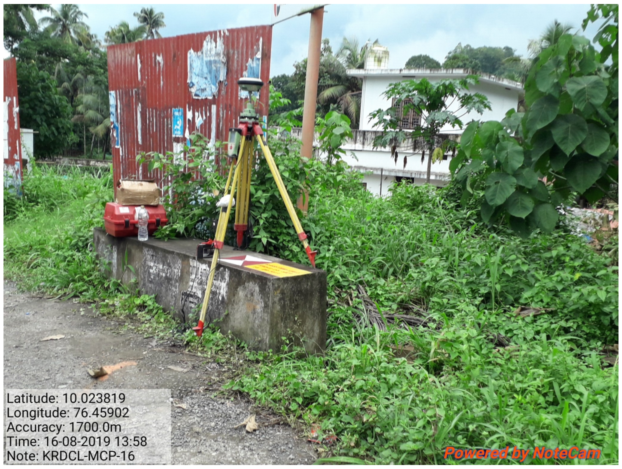
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
10° 01' 25.34974" N	76° 27' 23.46937" E	-67.177	659632.646	1108386.980	28.604

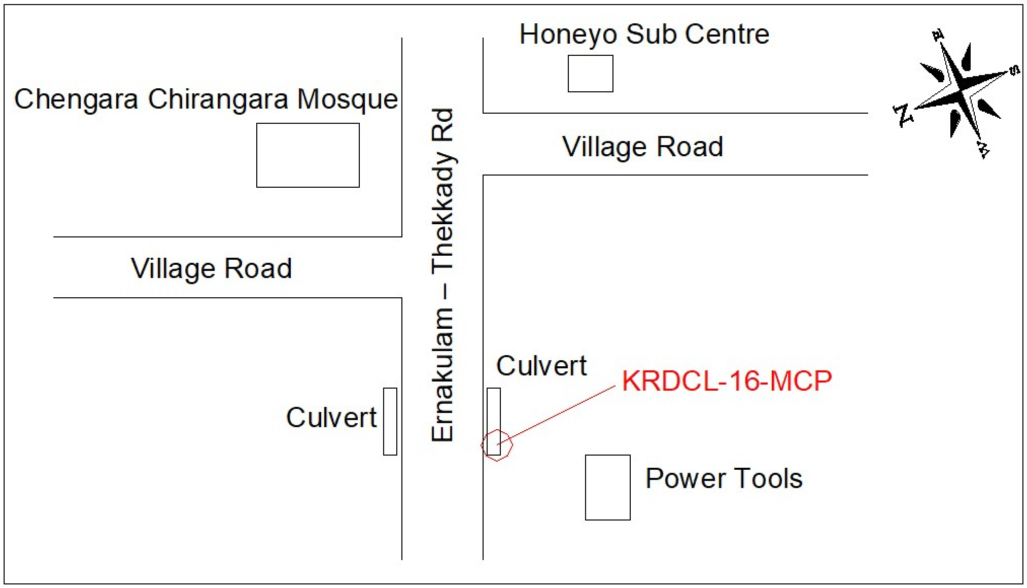
DESCRIPTION	The survey station, KRDCL-16-MCP is marked with red and white paint and nail point on the top of culvert on the side of the Ernakuolam-Thekkady BT road. The survey station is near by Chengara-Chirangara mosque. It is approximately 15 metres away from the power tools shop.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





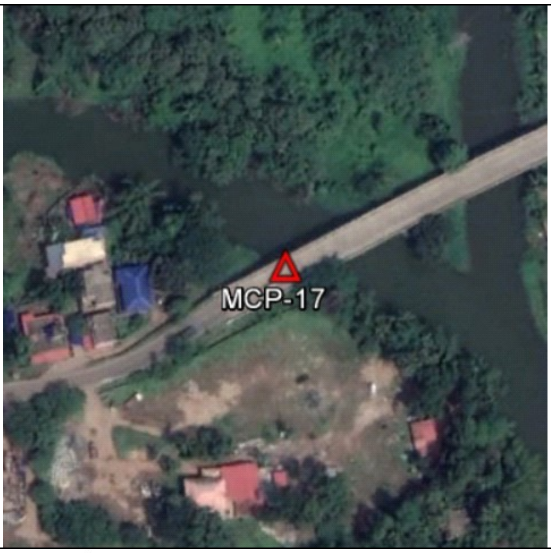
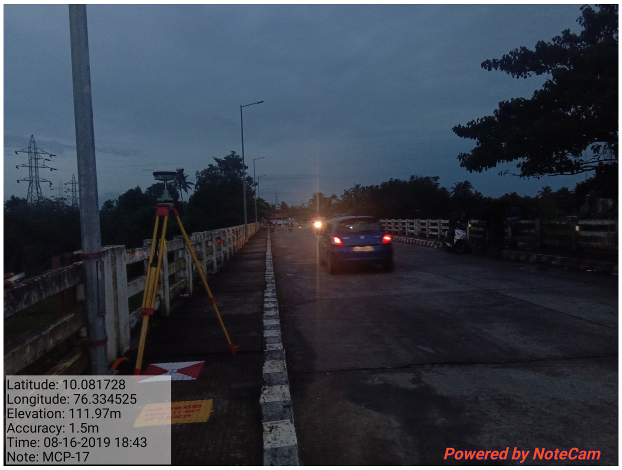
DGPS SURVEY REPORT

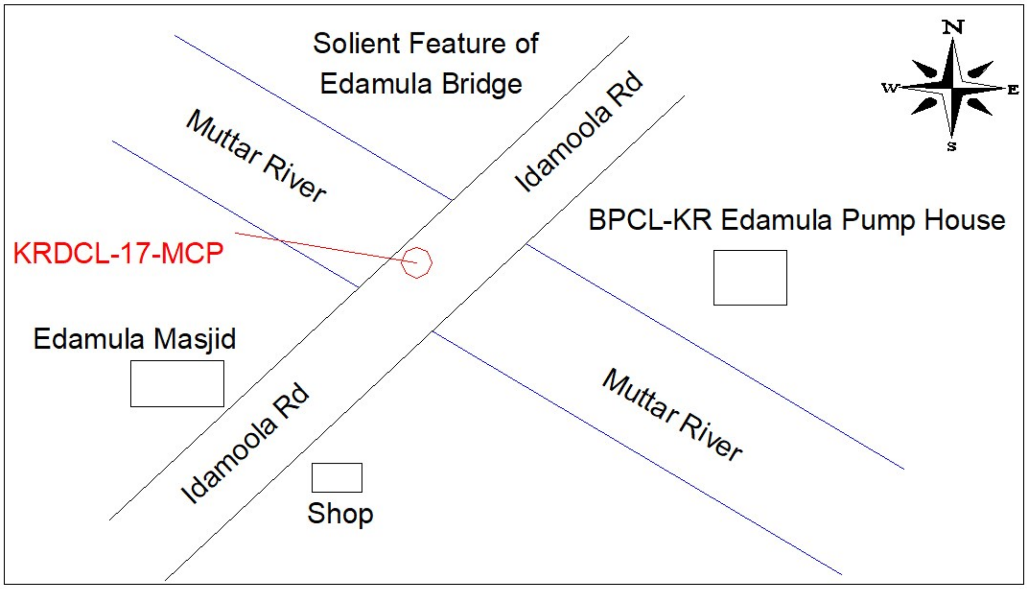
CLIENT	CONSULTANT	SURVEYED BY	DATE : 16-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-17-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
10° 04' 54.32896" N	76° 20' 04.42484" E	-86.413	646237.838	1114750.148	9.217

DESCRIPTION	The survey station, KRDCL-17-MCP is marked with red and white paint and nail point on the top of Bridge of the Idamoola BT road on top of the Muttar river . The survey station is near by Edamula Masjid. It is approximately 1 metres away from the lamp post.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	 Latitude: 10.081728 Longitude: 76.334525 Elevation: 111.97m Accuracy: 1.5m Time: 08-16-2019 18:43 Note: MCP-17 Powered by NoteCam



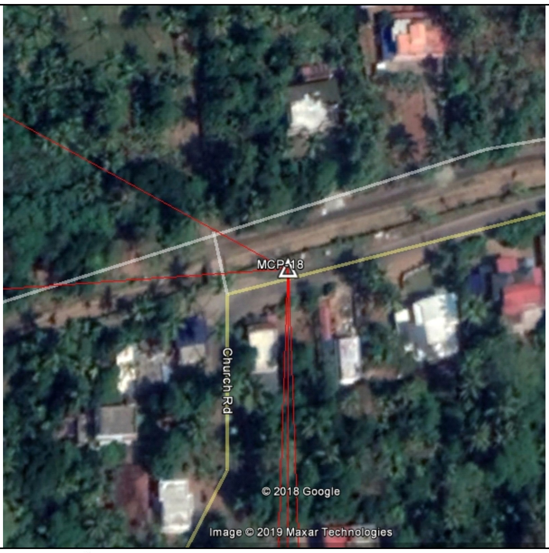
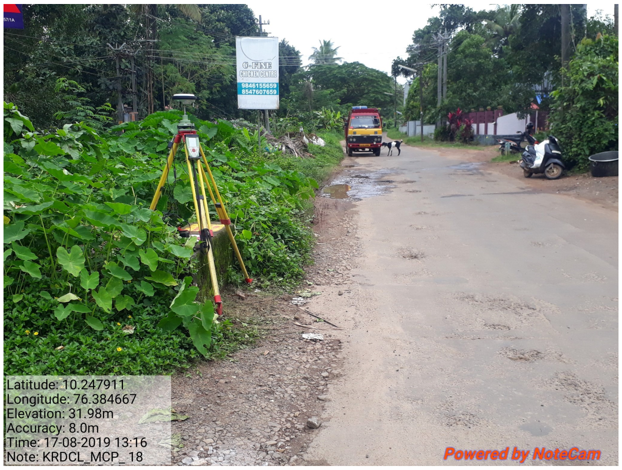
DGPS SURVEY REPORT

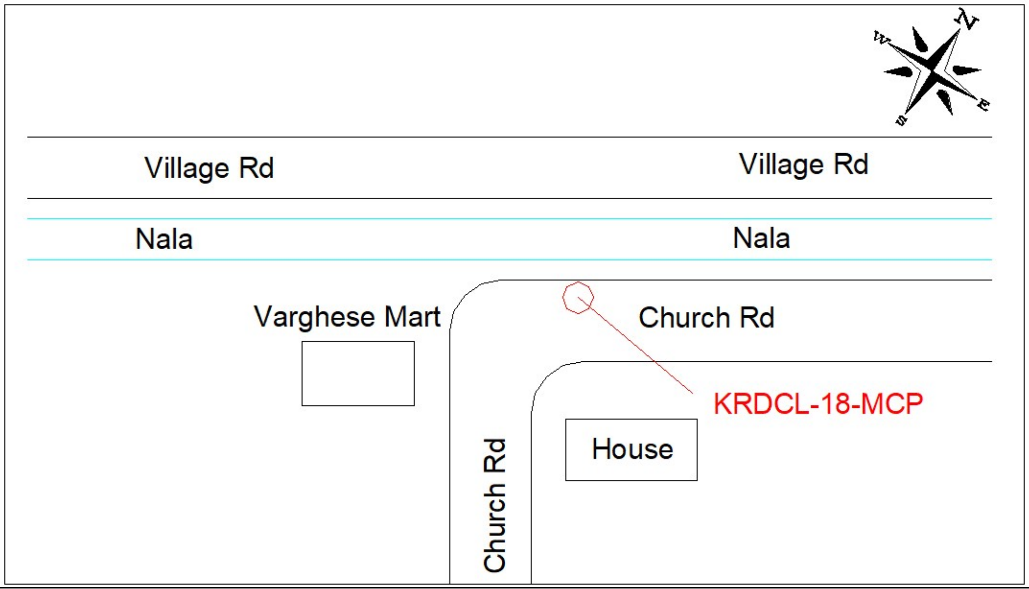
CLIENT	CONSULTANT	SURVEYED BY	DATE : 16-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID
			KRDCL-18-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
10° 14' 52.58461" N	76° 23' 04.94961" E	-69.563	651655.268	1133151.913	26.191

DESCRIPTION	The survey station, KRDCL-18-MCP is marked with red and white paint and nail point on the top of culvert to the side of a village BT road. The survey station is near by Vargesh market in Karukutty vilage. It is approximately 25 metres away from the transformer.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
 MCP-18 Church Rd © 2018 Google Image © 2019 Maxar Technologies	 Latitude: 10.247911 Longitude: 76.384667 Elevation: 31.98m Accuracy: 8.0m Time: 17-08-2019 13:16 Note: KRDCL_MCP_ 18



DGPS SURVEY REPORT

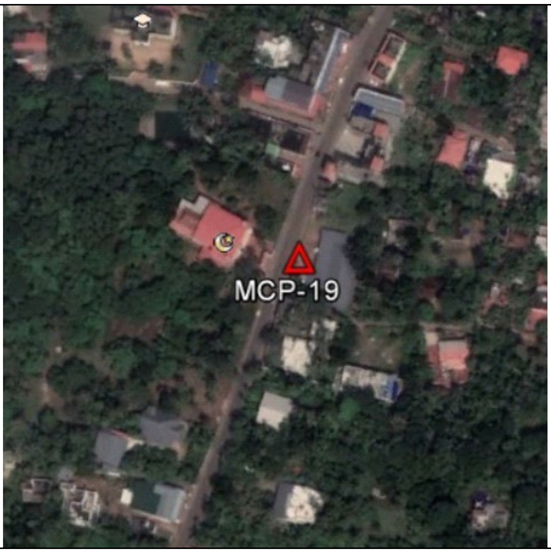
CLIENT KRDCL	CONSULTANT SYSTRA	SURVEYED BY GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DATE : 17-08-2019 DGPS POINT ID KRDCL-19-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

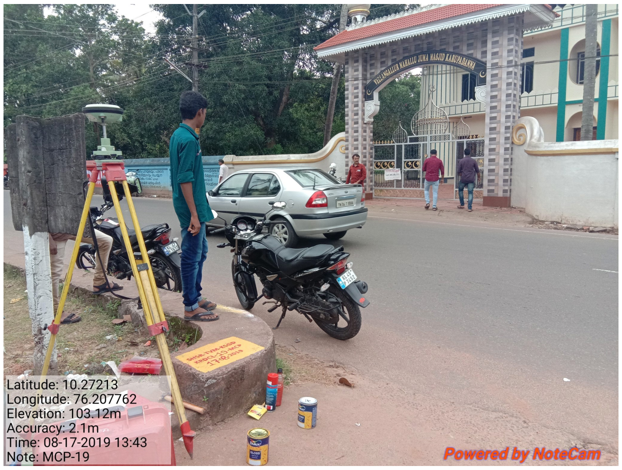
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
10° 16' 19.62638" N	76° 12' 27.89788" E	-86.428	632261.534	1135747.719	8.980

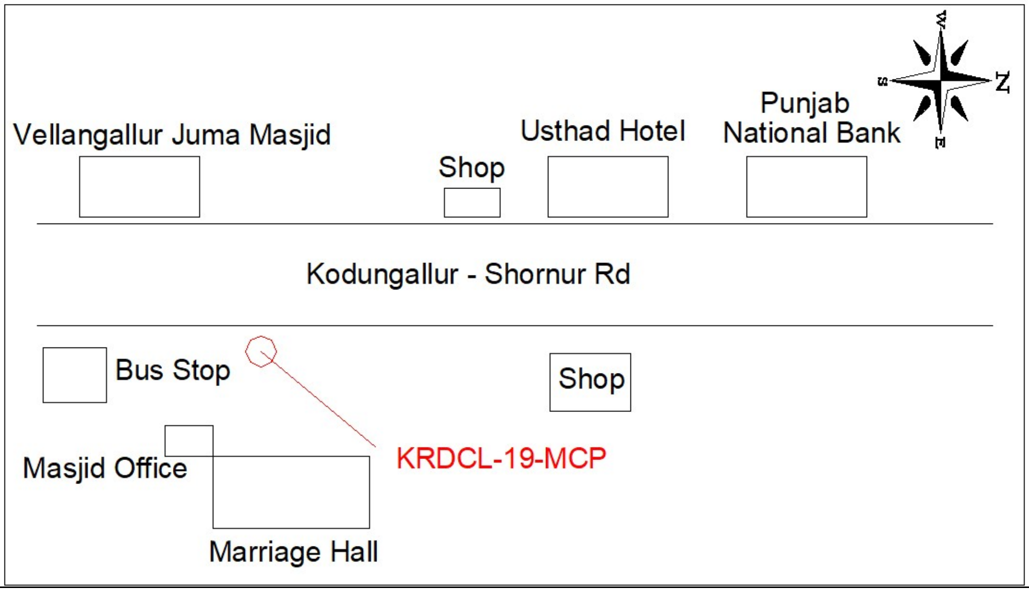
DESCRIPTION	The survey station, KRDCL-19-MCP is marked with red and white paint and nail point on the top of culvert on the side of the Kodunallur-Shornur BT road. The survey station is near by Karupadanna Masjid. It is approximately 1 metres away from the name board.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





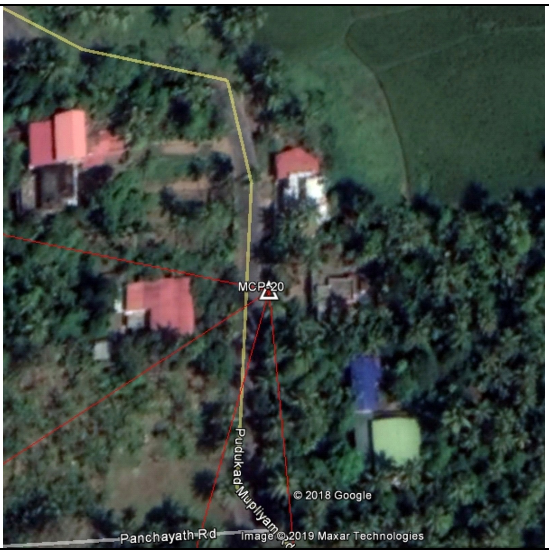
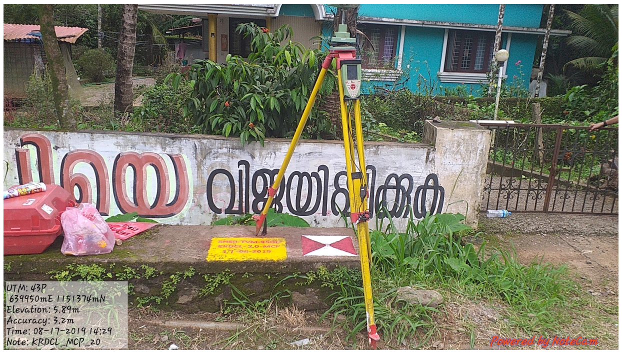
DGPS SURVEY REPORT

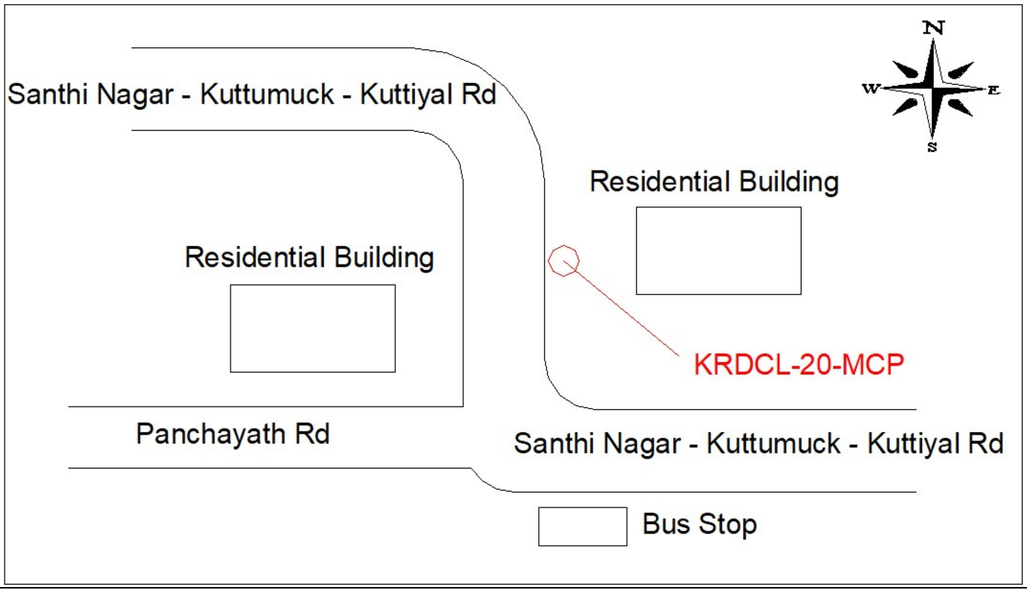
CLIENT	CONSULTANT	SURVEYED BY	DATE : 17-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID
			KRDCL-20-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
10° 24' 47.33055" N	76° 16' 42.78293" E	-87.184	639953.733	1151374.367	8.386

DESCRIPTION	The survey station, KRDCL-20-MCP is marked with red and white paint and nail point on the top of culvert on the side of the Shantinagar-Kuttumuck-Kuttiyal BT road. The survey station is near by Pudukad bus stop. It is approximately 5 metres away from the residential building.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
 MCP 20 Pudukad Mupliyam Rd Panchayath Rd © 2018 Google Image © 2019 Maxar Technologies	 UTM: 43P 639950mE 1151374mN Elevation: 5.89m Accuracy: 3.2m Time: 08-17-2019 14:29 Note: KRDCL_MCP_20 Powered by NoteCam



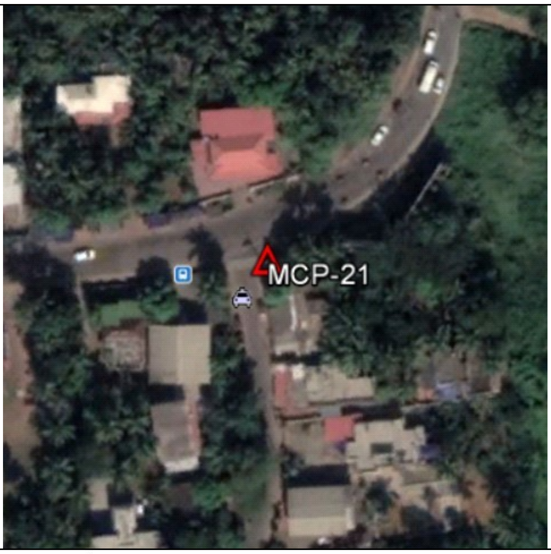
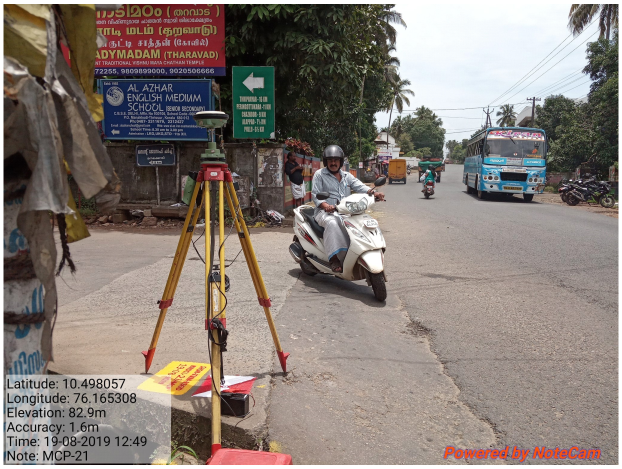
DGPS SURVEY REPORT

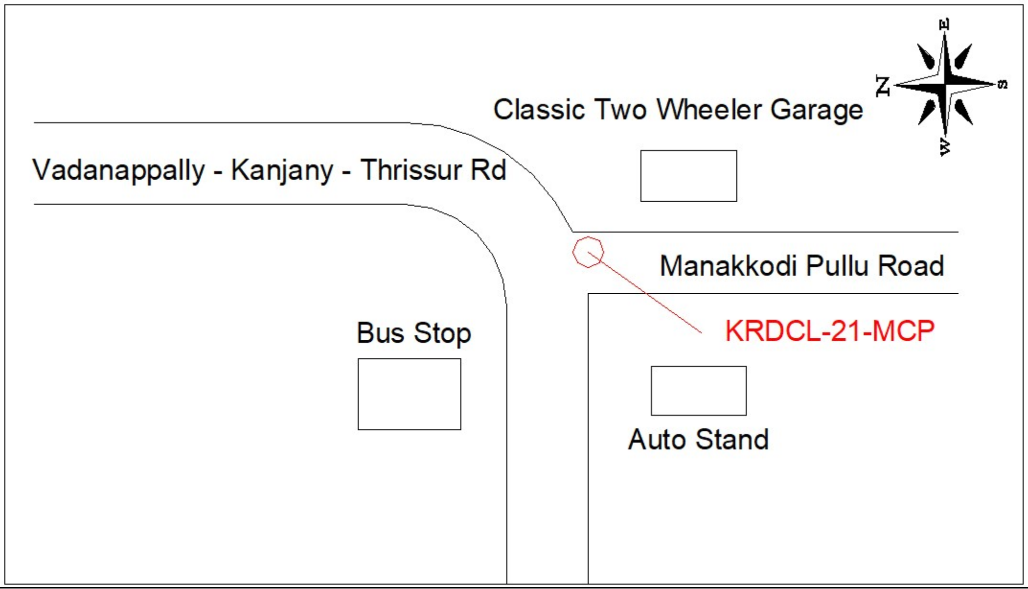
CLIENT	CONSULTANT	SURVEYED BY	DATE : 17-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-21-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
10° 29' 52.98721" N	76° 09' 55.01630" E	-90.125	627518.700	1160716.003	5.044

DESCRIPTION	The survey station, KRDCL-21-MCP is marked with red and white paint and nail point on the top of road junction formed between Vadanapally-Kanjany-Thrissur BT road and Manakkodi Pullu BT road . The survey station is near by Manakadi Bus stop. It is approximately 3 metres away from the telephone pole.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	 Latitude: 10.498057 Longitude: 76.165308 Elevation: 82.9m Accuracy: 1.6m Time: 19-08-2019 12:49 Note: MCP-21 Powered by NoteCam



E
N
S
W
Classic Two Wheeler Garage
Vadanappally - Kanjany - Thrissur Rd
Manakkodi Pullu Road
KRDCL-21-MCP
Bus Stop
Auto Stand

DGPS SURVEY REPORT

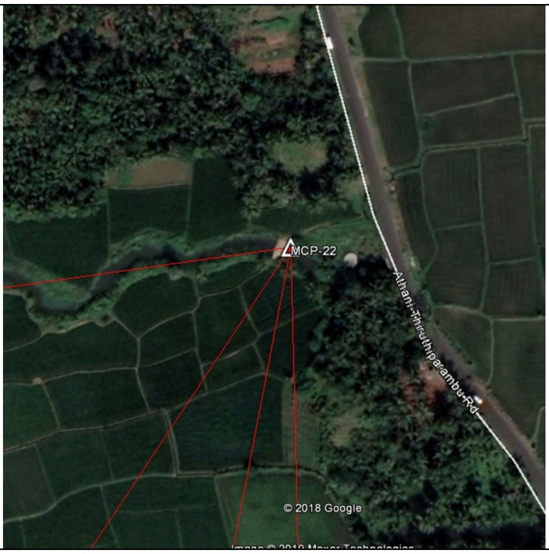
CLIENT	CONSULTANT	SURVEYED BY	DATE : 17-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID
			KRDCL-22-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

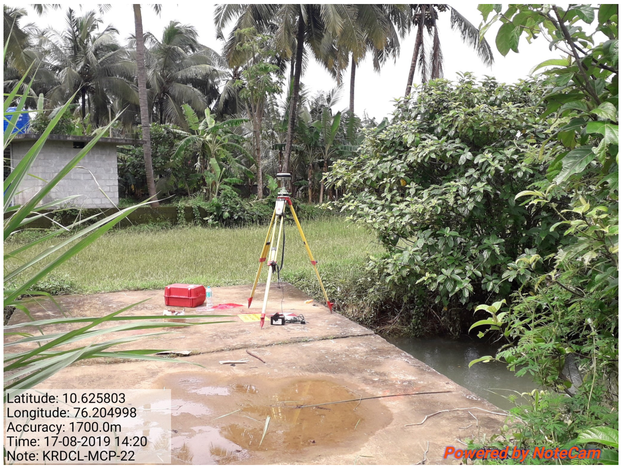
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
10° 37' 59.81861" N	76° 12' 16.28850" E	-80.563	631755.971	1175687.422	14.418

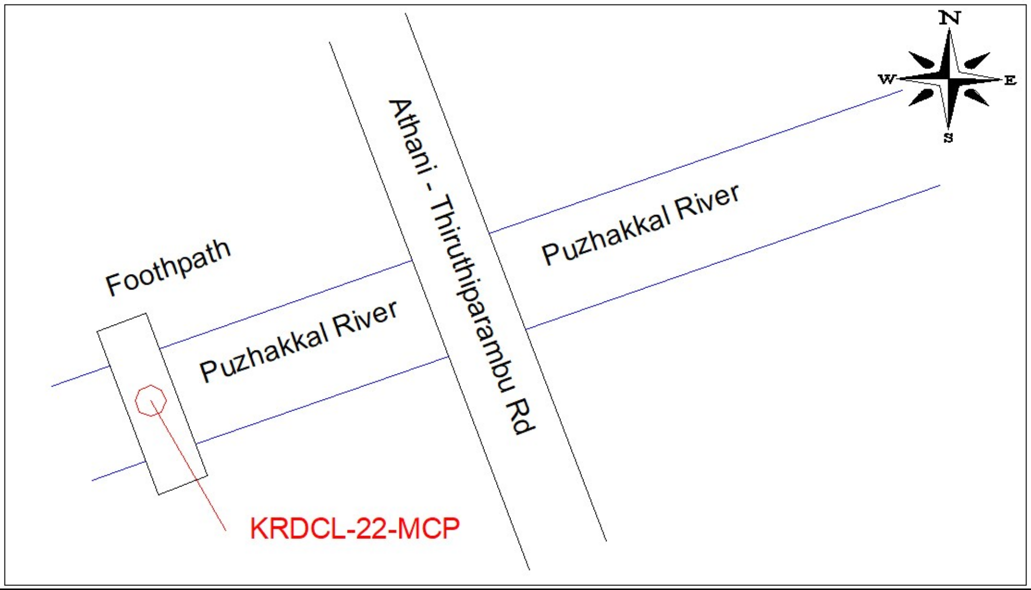
DESCRIPTION	The survey station, KRDCL-22-MCP is marked with red and white paint and nail point on the top of concrete slab across the Puzhakkal river parallel to the Athani-Thiruthiparambu BT road. The survey station is near by Thiruthu-Paramba Road in Atanai Village. It is approximately 21 metres away from the pump Shed.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





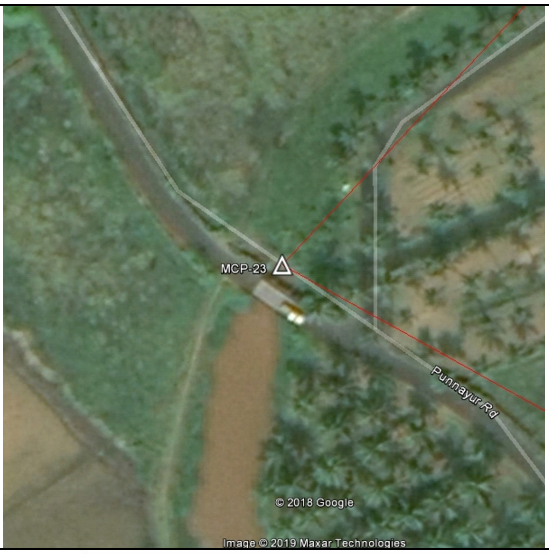
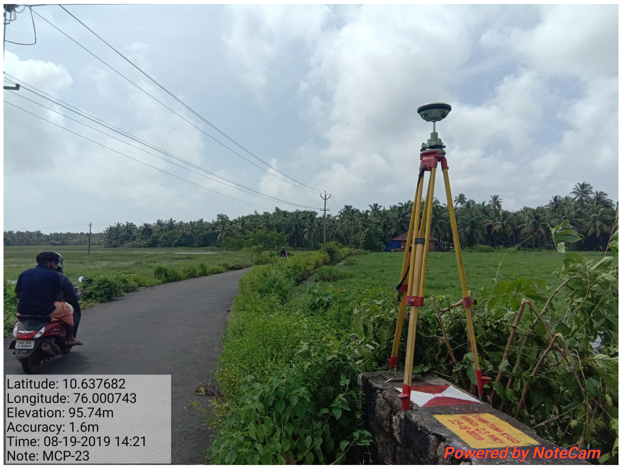
DGPS SURVEY REPORT

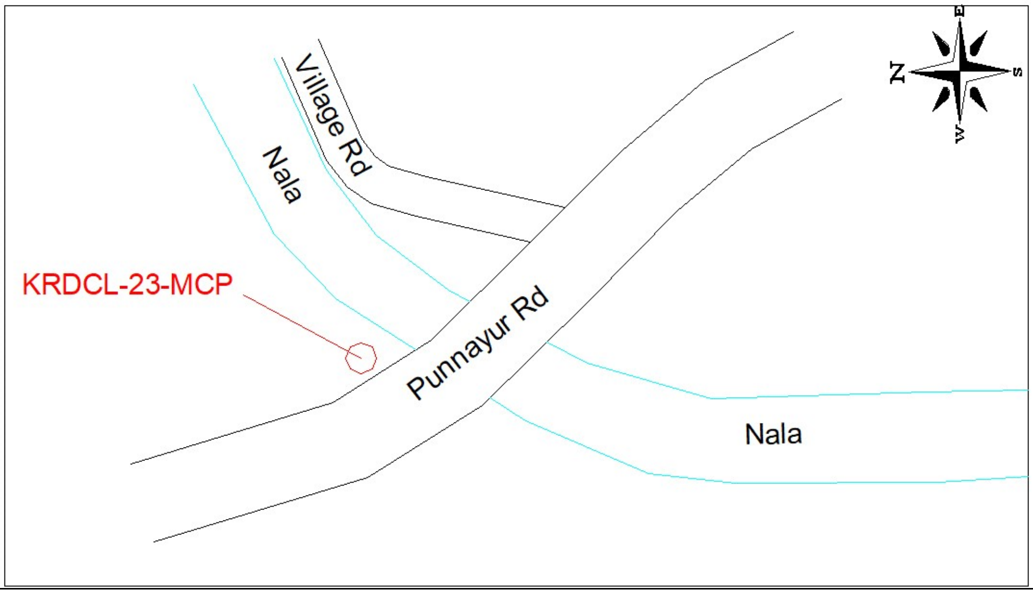
CLIENT	CONSULTANT	SURVEYED BY	DATE : 19-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID
			KRDCL-23-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
10° 38' 15.71807" N	76° 00' 02.63029" E	-91.127	609460.213	1176096.639	3.236

DESCRIPTION	The survey station, KRDCL-23-MCP is marked with red and white paint and nail point on the top of culvert on top of a nala and on the side of the Punnayoor BT road. The survey station is near by Puriyanoor panchayat office. It is approximately 46 metres away from the Post office.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
 MCP-23 Punnayur Rd © 2018 Google Image © 2019 Maxar Technologies	 Latitude: 10.637682 Longitude: 76.000743 Elevation: 95.74m Accuracy: 1.6m Time: 08-19-2019 14:21 Note: MCP-23 Powered by NoteCam



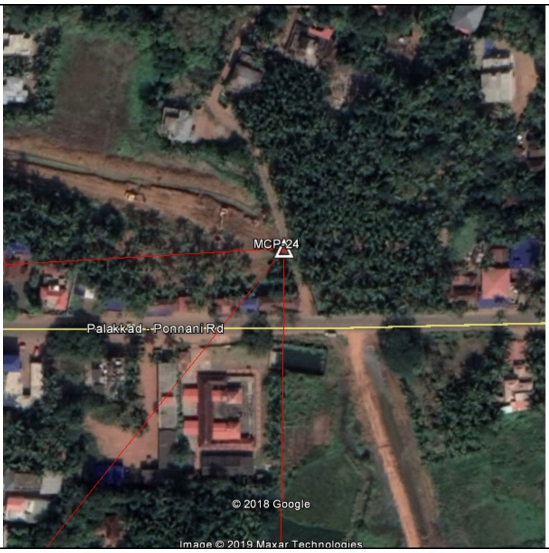
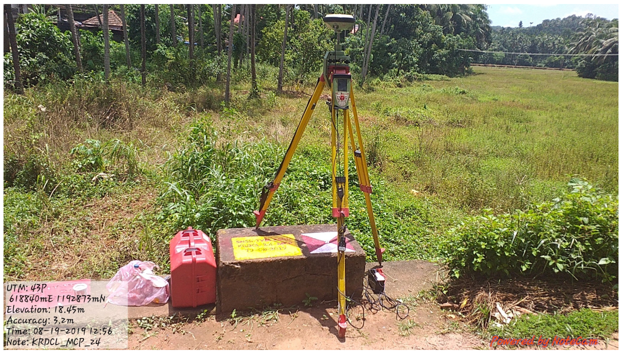
DGPS SURVEY REPORT

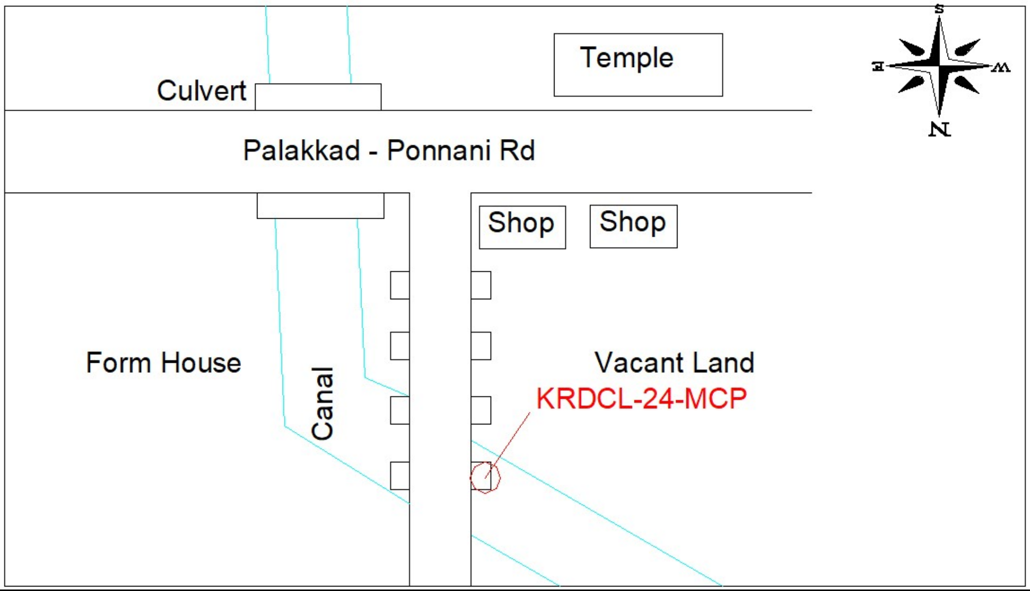
CLIENT	CONSULTANT	SURVEYED BY	DATE : 19-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID
			KRDCL-24-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
10° 47' 20.74643" N	76° 05' 13.28921" E	-79.235	618841.057	1192870.915	15.139

DESCRIPTION	The survey station, KRDCL-24-MCP is marked with red and white paint and nail point on the top of culvert. The survey station is near by Farm house in Pattitara. It is approximately 50 metres away from the Ponmani-Palakad BT road.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	



DGPS SURVEY REPORT

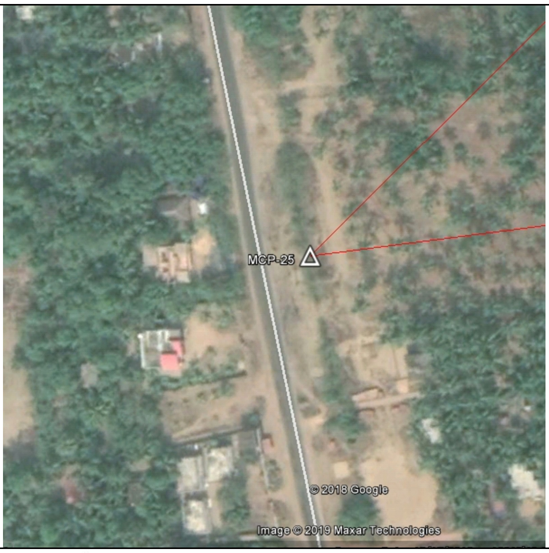
CLIENT KRDCL	CONSULTANT SYSTRA	SURVEYED BY GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DATE : 19-08-2019
			DGPS POINT ID
			KRDCL-25-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

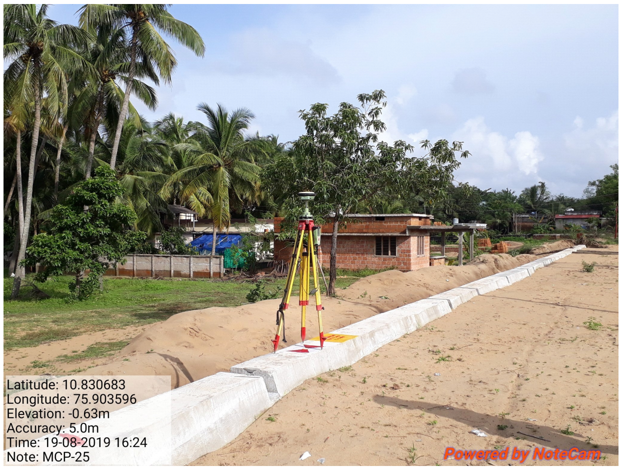
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
10° 49' 50.20782" N	75° 54' 13.08117" E	-89.530	598776.177	1197396.741	4.327

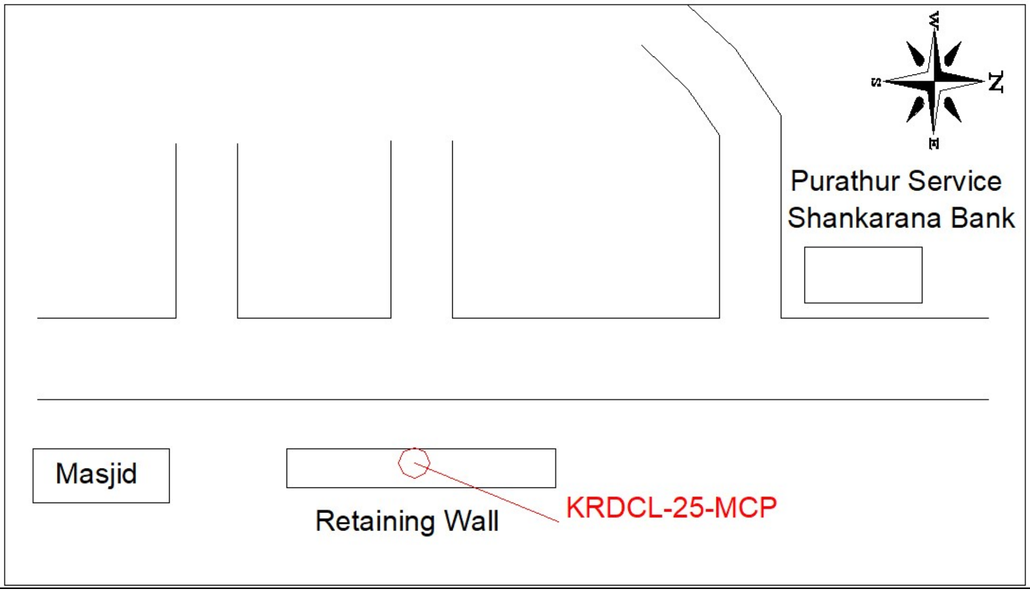
DESCRIPTION	The survey station, KRDCL-25-MCP is marked with red and white paint and nail point on the top of retaining structure. The survey station is near by Kattedaipalli Masjid. It is approximately 100 metres away from the Purathur Service Sahakarna Bank.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





DGPS SURVEY REPORT

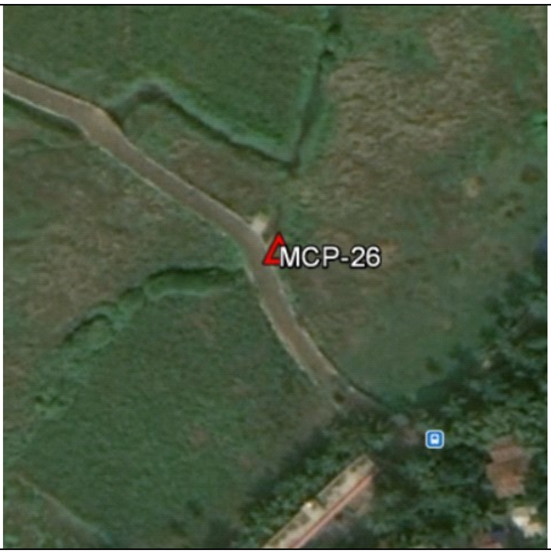
CLIENT	CONSULTANT	SURVEYED BY	DATE : 19-08-2019
KRDCL	SYSTRA	GEO KNO	DGPS POINT ID
			KRDCL-26-MCP

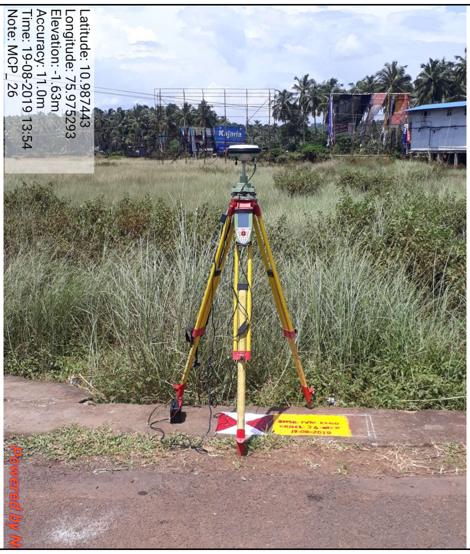
PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

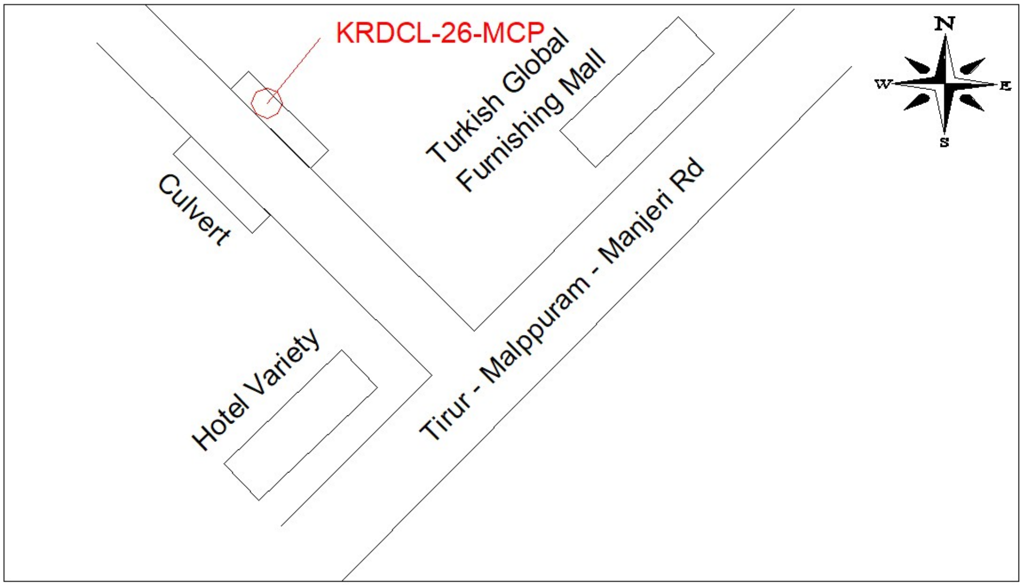
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
10° 59' 14.93506" N	75° 58' 31.16273" E	-84.738	606557.328	1214768.179	8.949

DESCRIPTION	The survey station, KRDCL-26-MCP is marked with red and white paint and nail point on the top of a Village BT road. The survey station is near by Turkish Global Furniture in Permanna Village. It is approximately 50 metres away from the Thrissur-Malappuram BT road.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH






KRDCL-26-MCP
Turkish Global Furnishing Mall
Culvert
Hotel Variety
Tirur - Malppuram - Manjeri Rd
N
W
E
S

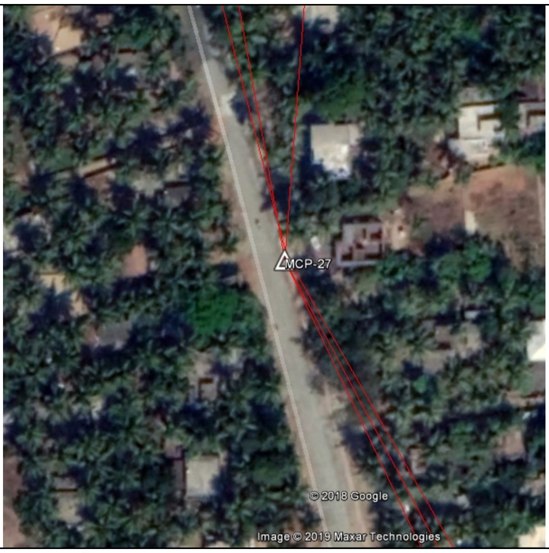
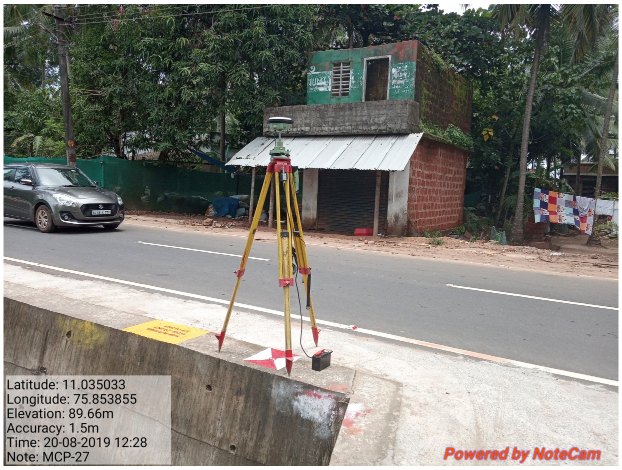
DGPS SURVEY REPORT

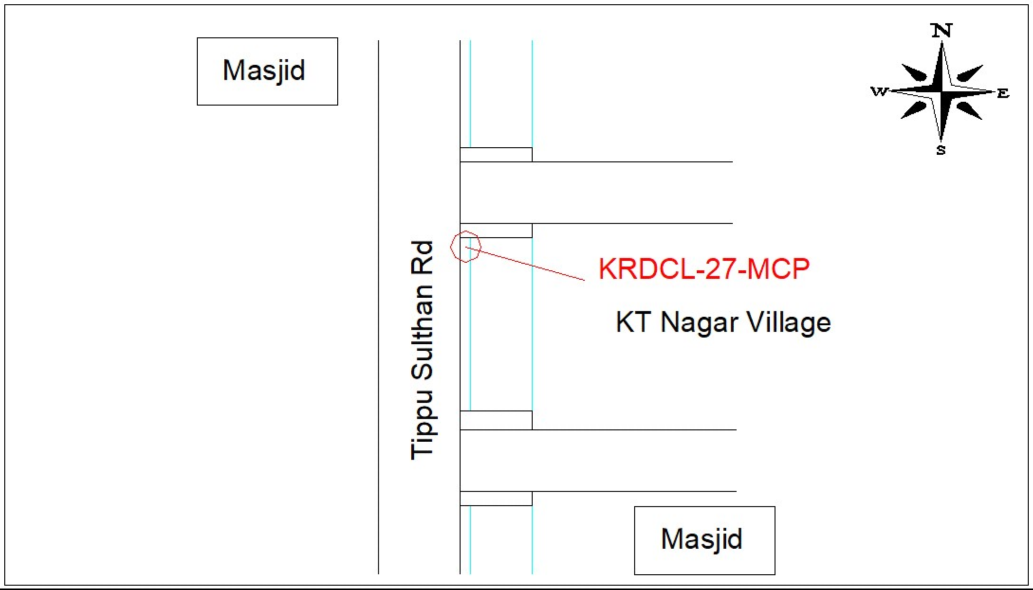
CLIENT	CONSULTANT	SURVEYED BY	DATE : 19-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-27-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
11° 02' 05.98591" N	75° 51' 13.78517" E	-89.964	593267.785	1219981.997	3.362

DESCRIPTION	The survey station, KRDCL-27-MCP is marked with red and white paint and nail point on the top of bridge over the Tippusulthan BT road . The survey station is near by Badriyya Jumma Masjid. It is approximately 100 metres away from the Aviyal Valiya Jumma Masjid.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	 Latitude: 11.035033 Longitude: 75.853855 Elevation: 89.66m Accuracy: 1.5m Time: 20-08-2019 12:28 Note: MCP-27 Powered by NoteCam



DGPS SURVEY REPORT

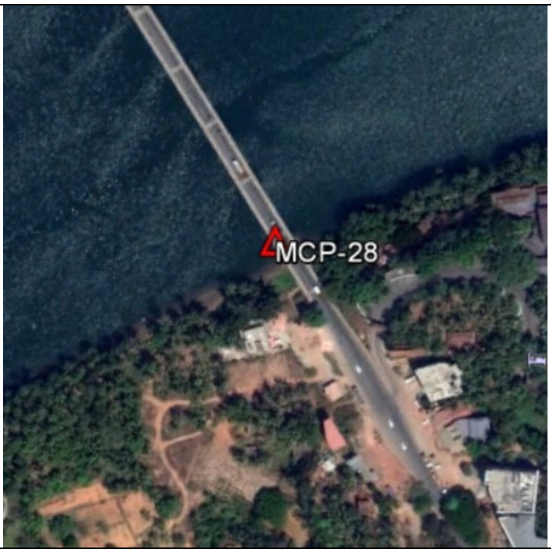
CLIENT	CONSULTANT	SURVEYED BY	DATE : 19-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID
			KRDCL-28-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

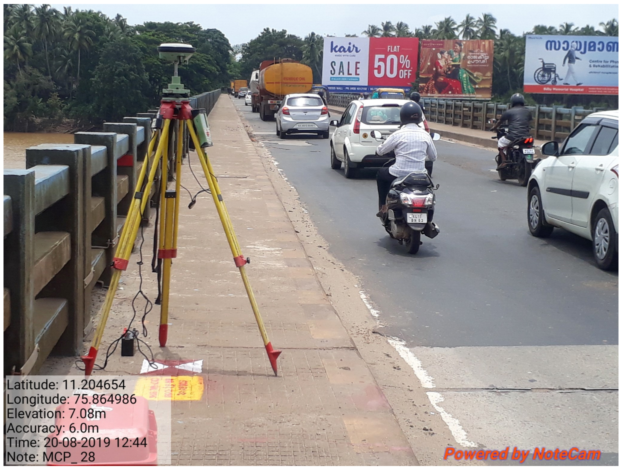
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
11° 12' 16.91462" N	75° 51' 53.84522" E	-82.824	594428.769	1238751.705	10.337

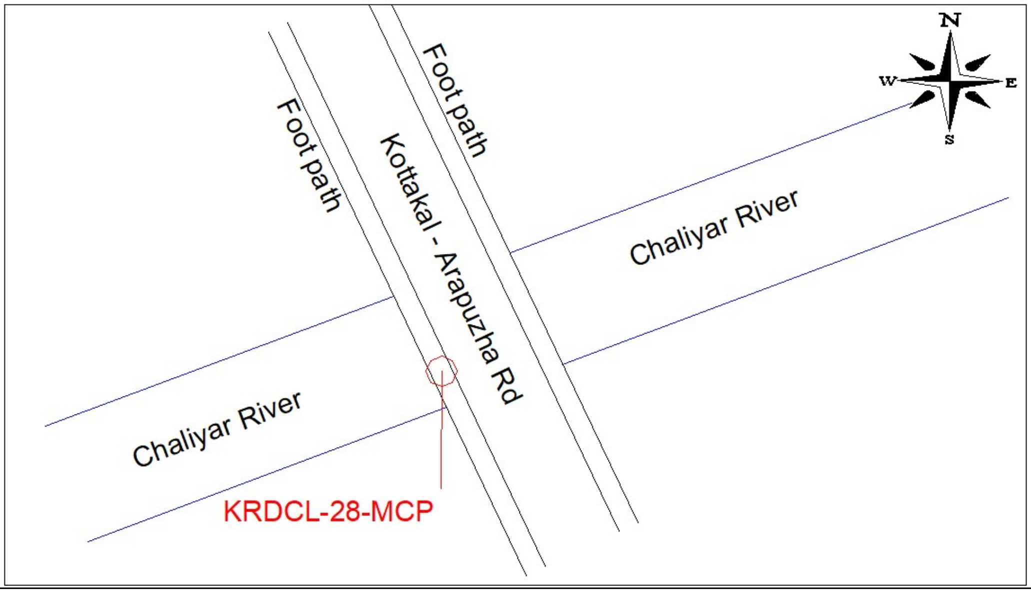
DESCRIPTION	The survey station, KRDCL-28-MCP is marked with red and white paint and nail point on the top of bridge of the Kottakal-Alapuzha BT road . The bridge stands across the Chaliyar River. It is approximately 70 metres away from the Standard Cars.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





DGPS SURVEY REPORT

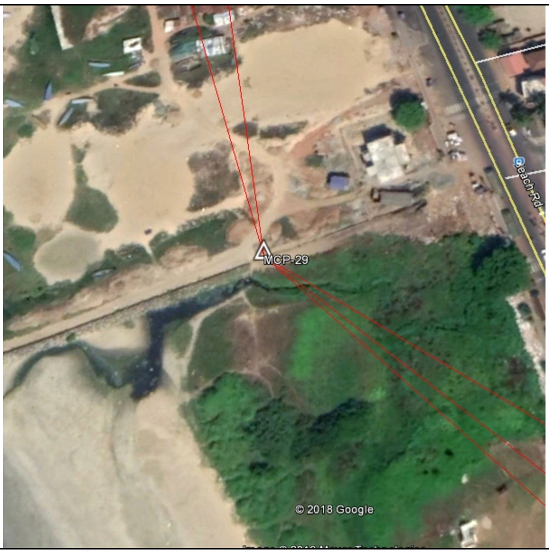
CLIENT	CONSULTANT	SURVEYED BY	DATE : 20-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID
			KRDCL-29-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

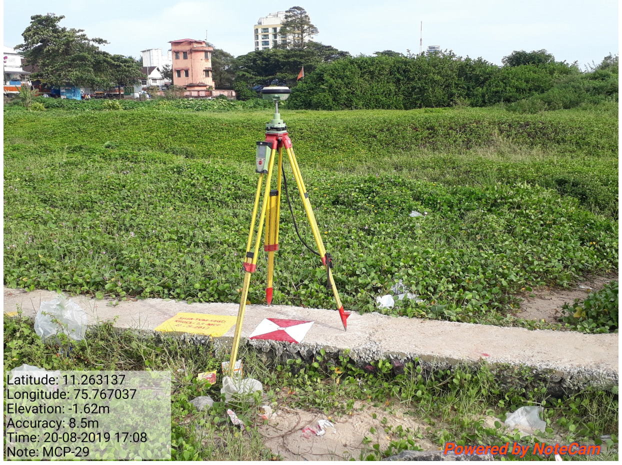
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
11° 15' 47.23619" N	75° 46' 01.69426" E	-89.996	583732.147	1245182.605	3.108

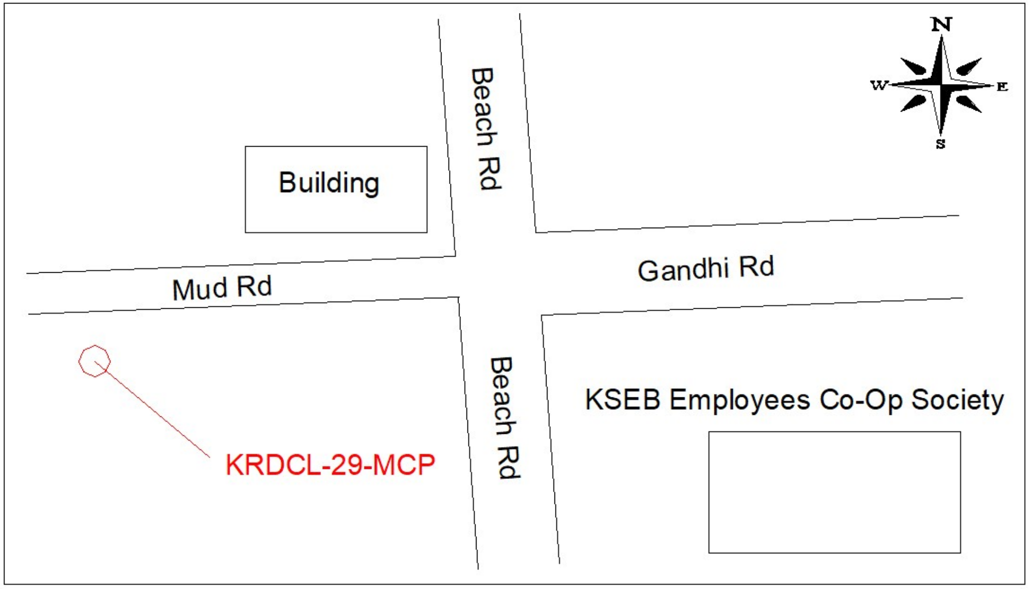
DESCRIPTION	The survey station, KRDCL-29-MCP is marked with red and white paint and nail point on the top of retaining structure on the side of the mud road leading towards the beach from the Beach BT road. The survey station is near by KSES Employees society in Kozhikode. It is approximately 50 metres away from the building under construction.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





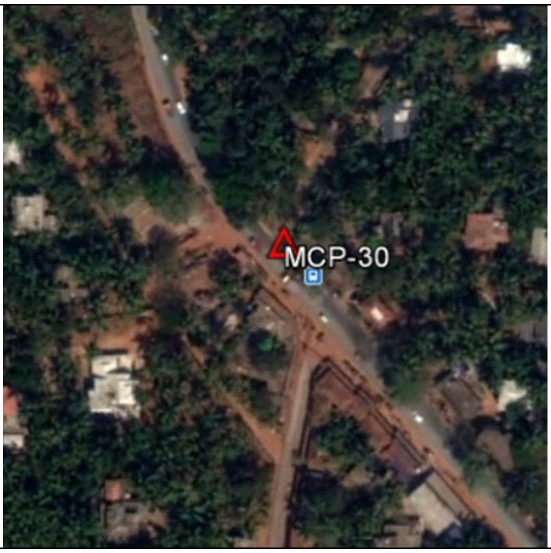
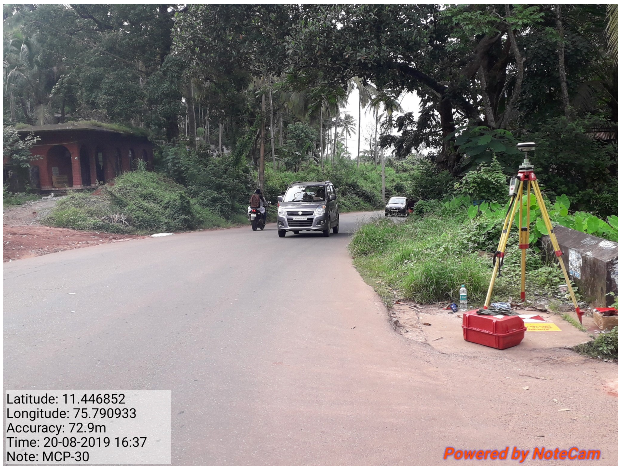
DGPS SURVEY REPORT

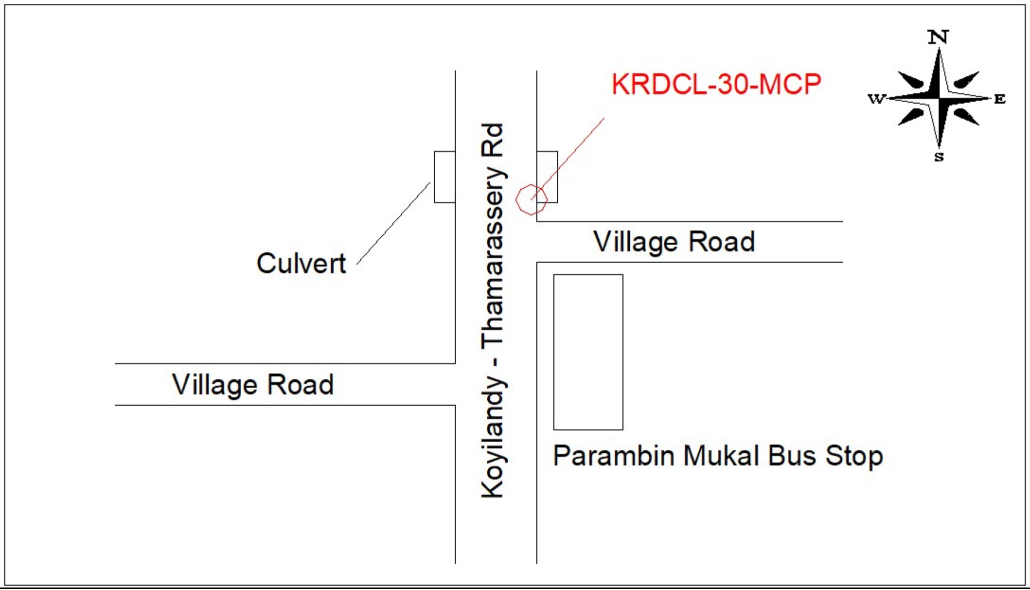
CLIENT	CONSULTANT	SURVEYED BY	DATE : 20-08-2019
			DGPS POINT ID
			KRDCL-30-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
11° 26' 49.93799" N	75° 47' 26.95800" E	-35.111	586262.096	1265545.989	57.727

DESCRIPTION	The survey station, KRDCL-30-MCP is marked with red and white paint and nail point near a culvert on the top of the Koyilandy-Thamaraserry BT road . The survey station is near by Parambinate bus stop. It is approximately 15 metres away from the IRC bakery .

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	 Latitude: 11.446852 Longitude: 75.790933 Accuracy: 72.9m Time: 20-08-2019 16:37 Note: MCP-30 Powered by NoteCam



DGPS SURVEY REPORT

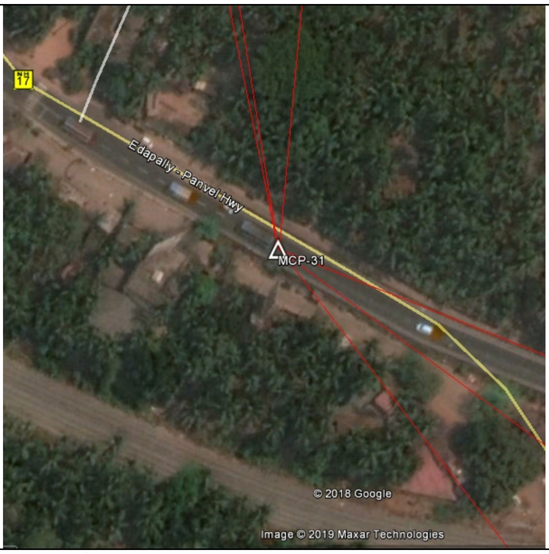
CLIENT	CONSULTANT	SURVEYED BY	DATE : 20-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-31-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

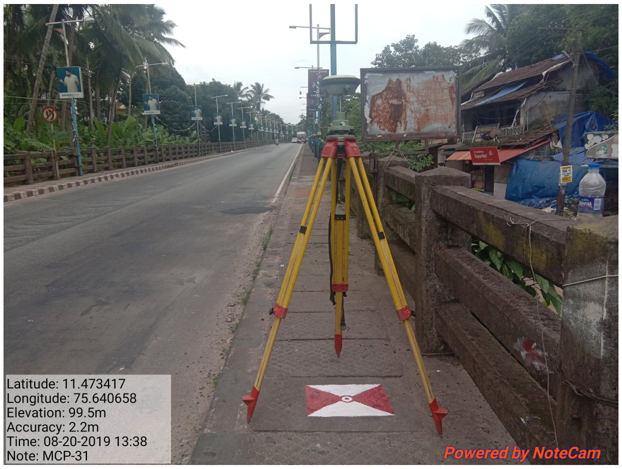
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
11° 28' 24.28157" N	75° 38' 26.44258" E	-81.594	569877.471	1268403.309	11.386

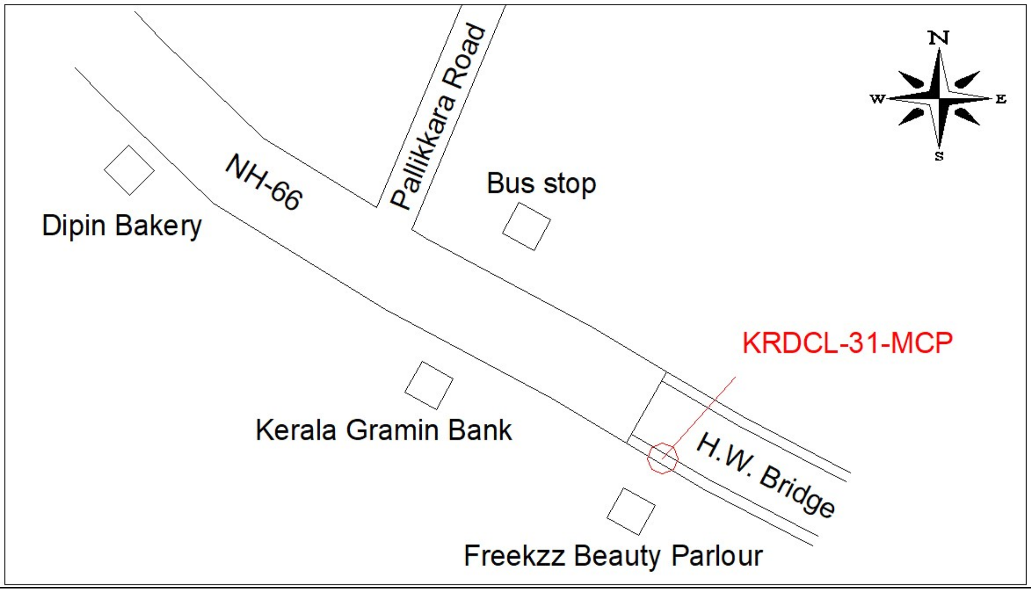
DESCRIPTION	The survey station, KRDCL-31-MCP is marked with red and white paint and nail point on the top of H.W bridge over the NH66 BT Road . The survey station is near by Chinagapuram bus stop. It is approximately 16 metres away from the Freekzz beauty parlour.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





DGPS SURVEY REPORT

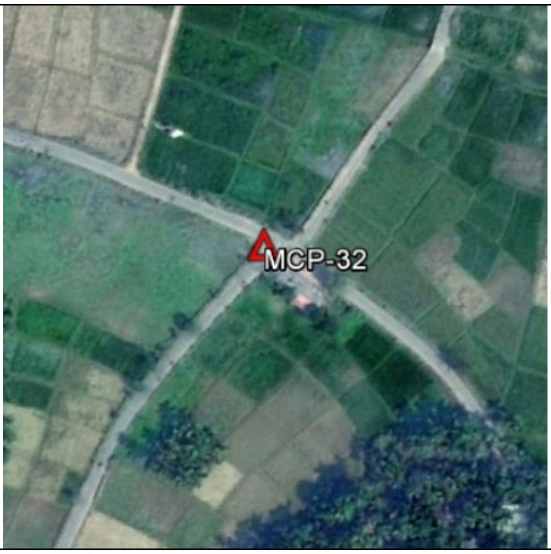
CLIENT	CONSULTANT	SURVEYED BY	DATE : 20-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-32-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

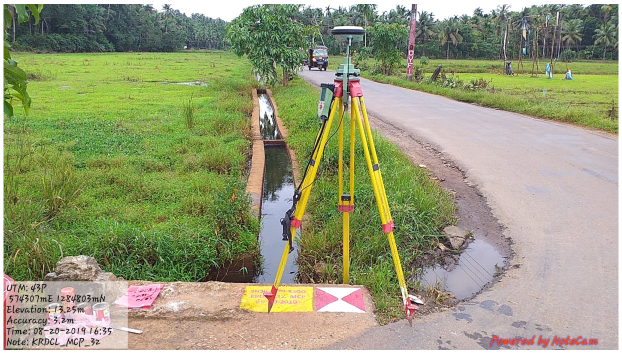
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
11° 37' 17.90772" N	75° 40' 53.83912" E	-88.703	574304.244	1284805.041	4.117

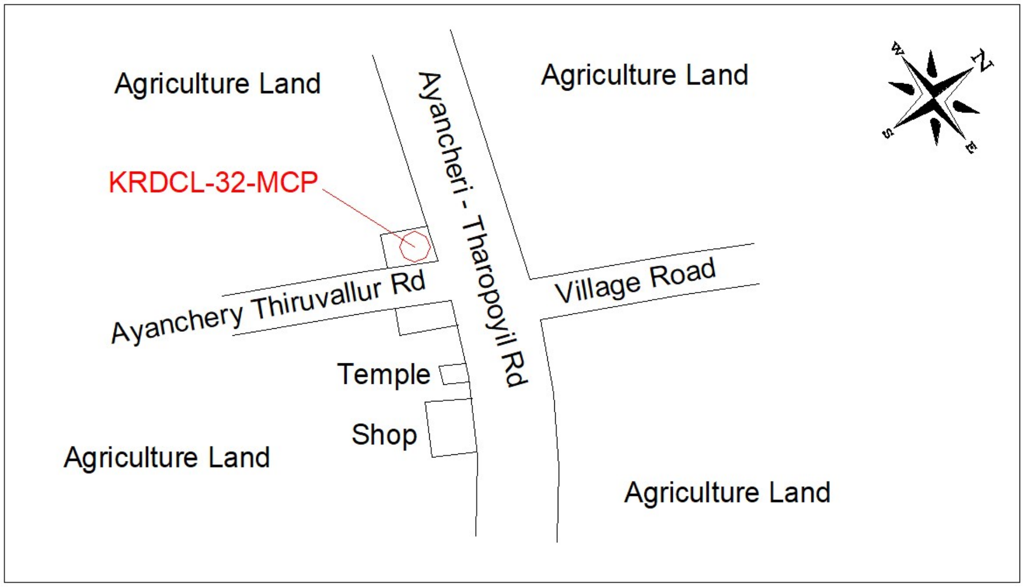
DESCRIPTION	The survey station, KRDCL-32-MCP is marked with red and white paint and nail point on the top of culvert to the side of the Ayancherry-Thiruvallur BT road. The survey station is near by General store in Ayanchery Village. It is approximately 8 metres away from the temple.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





DGPS SURVEY REPORT

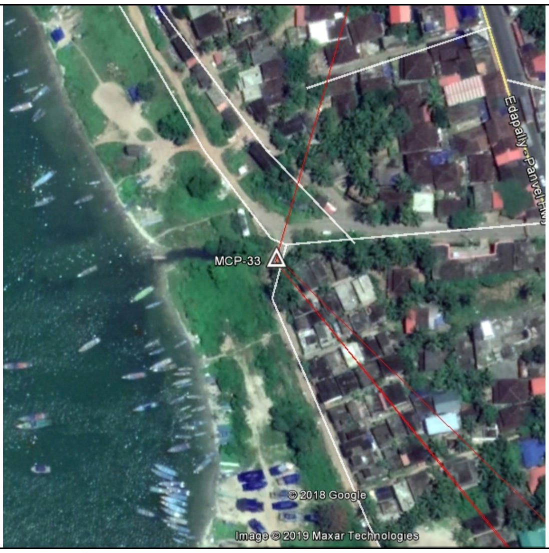
CLIENT	CONSULTANT	SURVEYED BY	DATE : 21-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-33-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

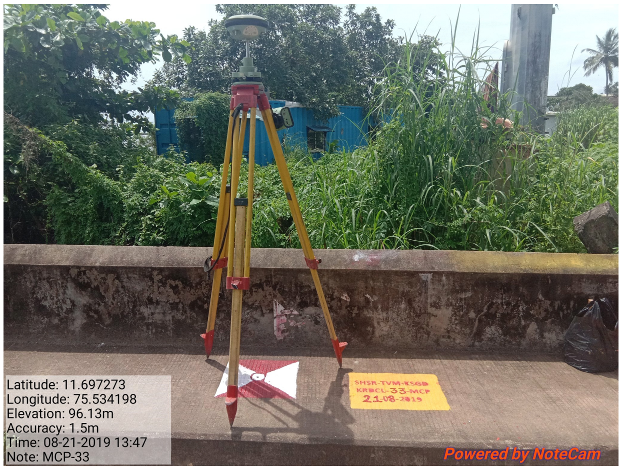
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
11° 41' 50.24570" N	75° 32' 03.03284" E	-88.318	558214.746	1293135.987	4.680

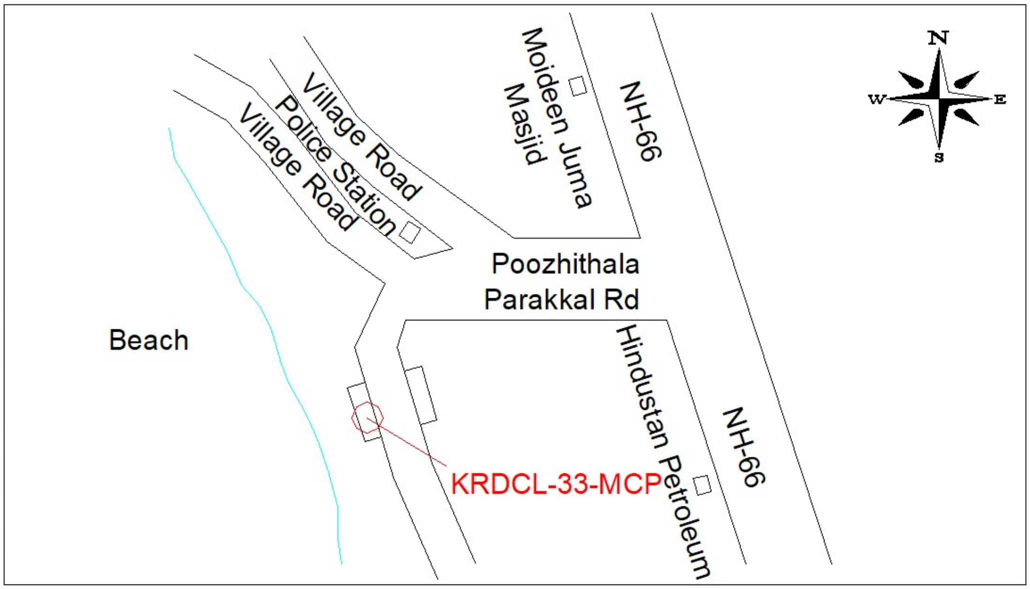
DESCRIPTION	The survey station, KRDCL-33-MCP is marked with red and white paint and nail point on the top of culvert to the side of the Mahe Beach BT road. The survey station is near by NH66 on Parakkal Village. It is approximately 30 metres away from the Police station.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





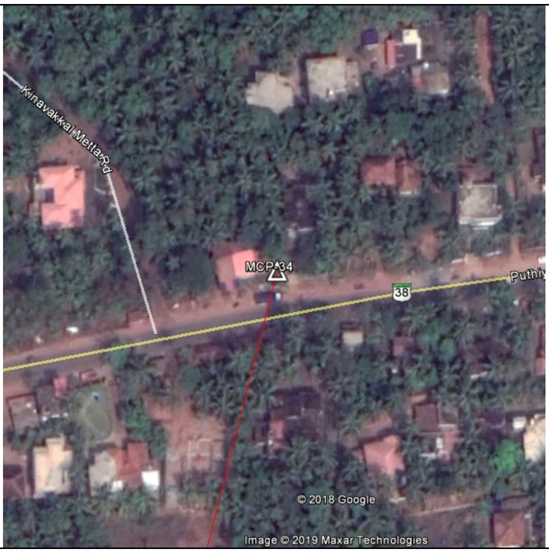
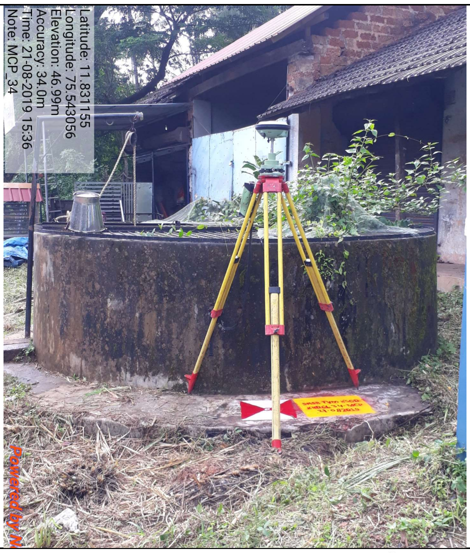
DGPS SURVEY REPORT

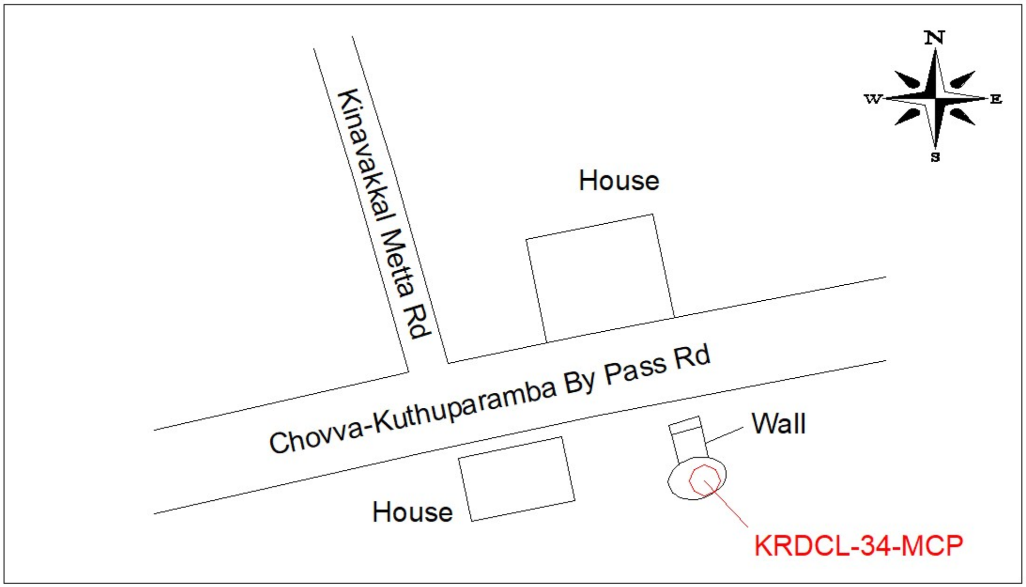
CLIENT	CONSULTANT	SURVEYED BY	
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DATE : 21-08-2019 DGPS POINT ID KRDCL-34-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
11° 49' 52.43404" N	75° 32' 34.93724" E	-55.311	559151.972	1307949.151	37.297

DESCRIPTION	The survey station, KRDCL-34-MCP is marked with red and white paint and nail point on the top of base of the well. The well is on the side of the Chovva-Kuthuparamba BT Road. It is approximately 10 metres away from the residential building.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
 Kinavakkal Metta Rd MCP_34 38 Puthiy © 2018 Google Image © 2019 Maxar Technologies	 Latitude: 11.831155 Longitude: 75.543056 Elevation: 46.99m Accuracy: 34.0m Time: 21-08-2019 15:36 Note: MCP_34



DGPS SURVEY REPORT

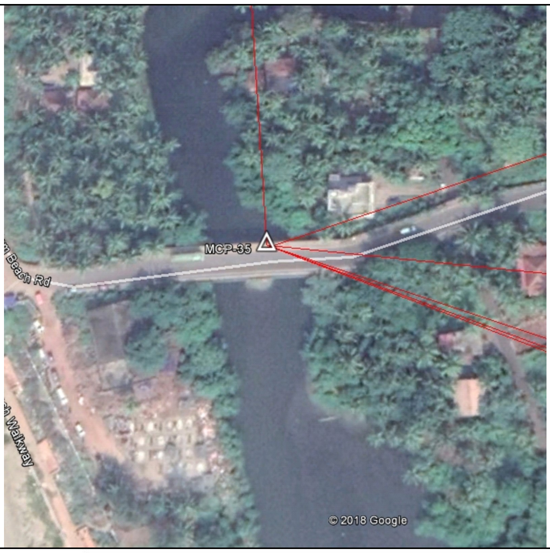
CLIENT KRDCL	CONSULTANT SYSTRA	SURVEYED BY GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DATE : 21-08-2019
			DGPS POINT ID
			KRDCL-35-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

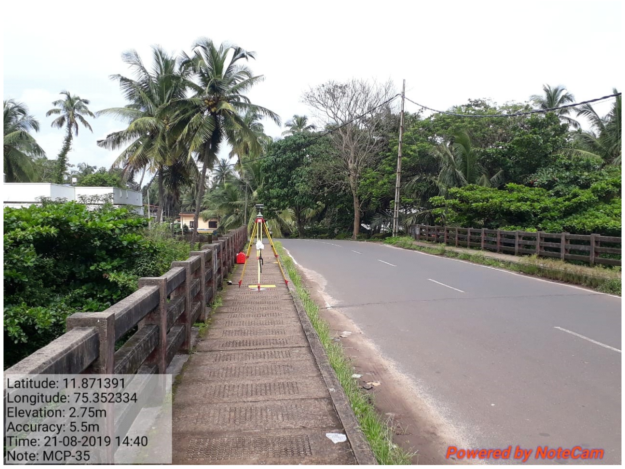
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
11° 52' 17.10925" N	75° 21' 08.84128" E	-85.049	538386.341	1312359.780	7.390

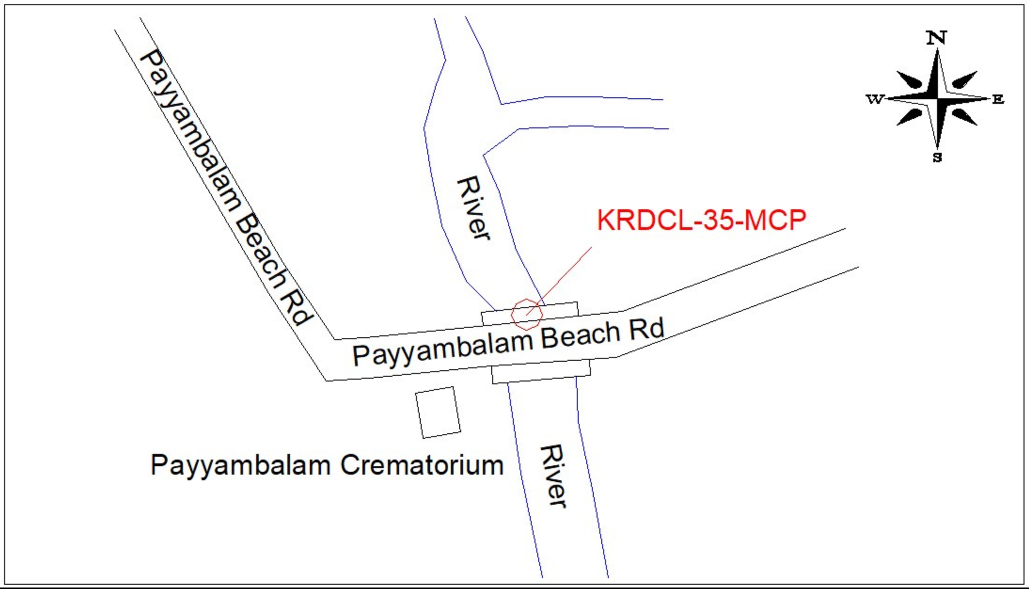
DESCRIPTION	The survey station, KRDCL-35-MCP is marked with red and white paint and nail point on the top of bridge of the Bayamballam beach BT road . The survey station is near by Payambalam Crematorium. It is approximately 40 metres away from the footpath.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





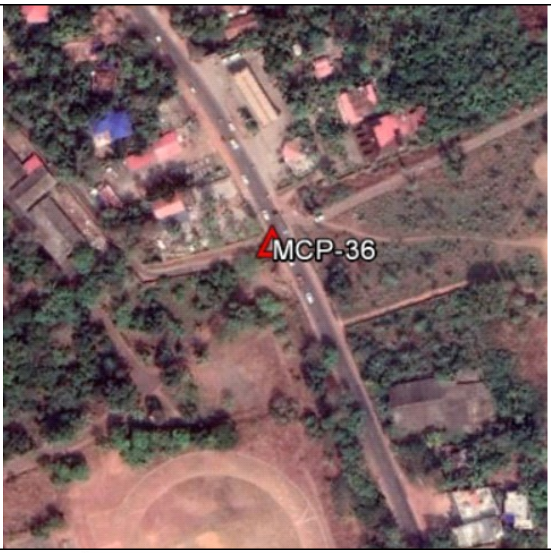
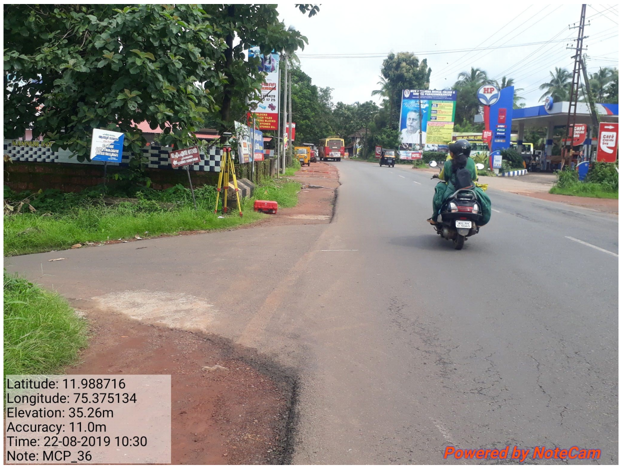
DGPS SURVEY REPORT

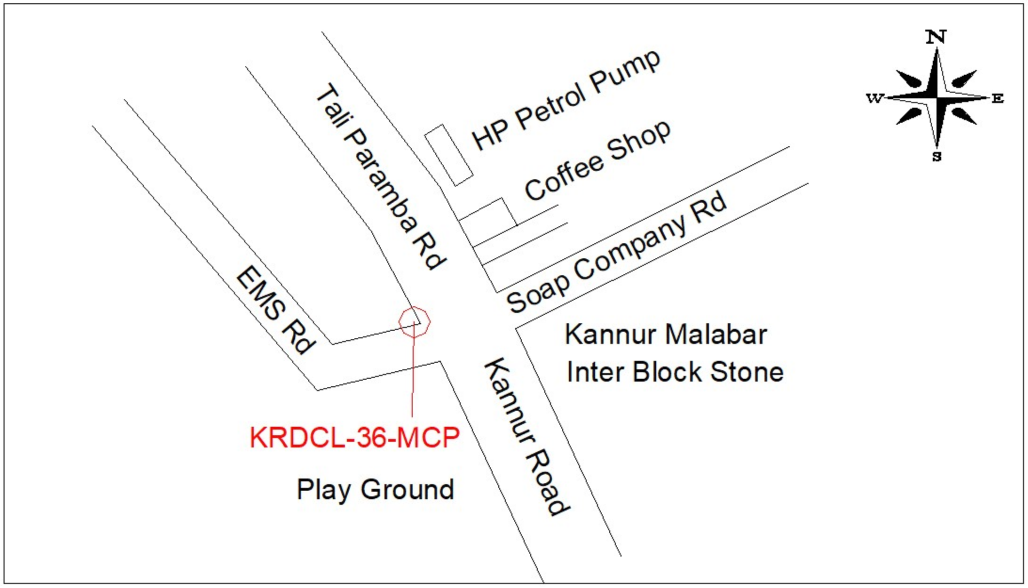
CLIENT	CONSULTANT	SURVEYED BY	DATE : 21-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-36-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
11° 59' 19.68823" N	75° 22' 30.29054" E	-60.028	540832.897	1325343.178	31.942

DESCRIPTION	The survey station, KRDCL-36-MCP is marked with red and white paint and nail point on the top of culvert near the junction of the EMS BT road on the Tali Paramba-Kannur BT Road. The survey station is near by Coffee day Shop in Aroli Village. It is approximately 50 metres away from the petrol station.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	 Latitude: 11.988716 Longitude: 75.375134 Elevation: 35.26m Accuracy: 11.0m Time: 22-08-2019 10:30 Note: MCP_36 Powered by NoteCam



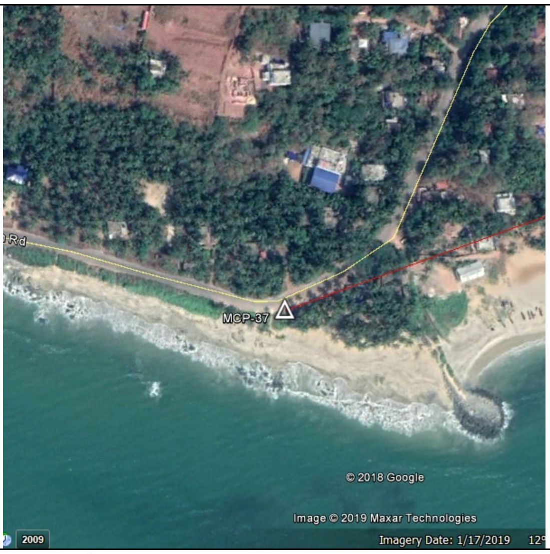
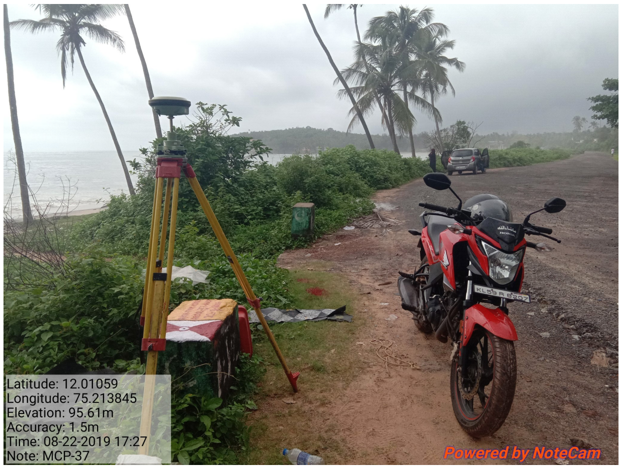
DGPS SURVEY REPORT

CLIENT	CONSULTANT	SURVEYED BY	DATE : 22-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-37-MCP

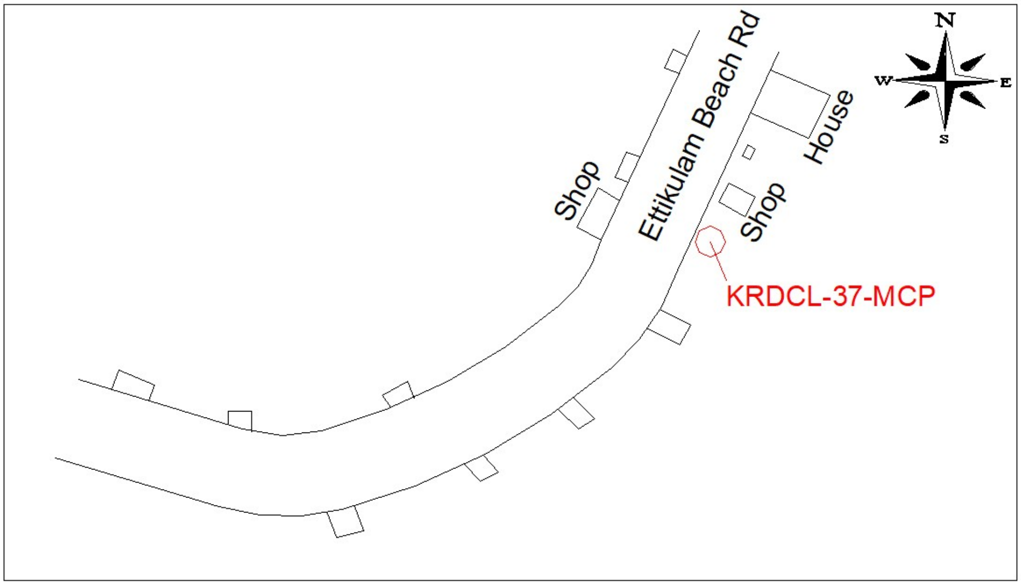
PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
12° 00' 38.04502" N	75° 12' 49.74779" E	-85.914	523275.266	1327731.269	5.577

DESCRIPTION	The survey station, KRDCL-37-MCP is marked with red and white paint and nail point on the top of culvert on the side of the Ettikukulam beach BT road. The survey station is near by near a shop on the Ettikulam beach. It is approximately 120 metres away from the sea shore.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	

Latitude: 12.01059
Longitude: 75.213845
Elevation: 95.61m
Accuracy: 1.5m
Time: 08-22-2019 17:27
Note: MCP-37



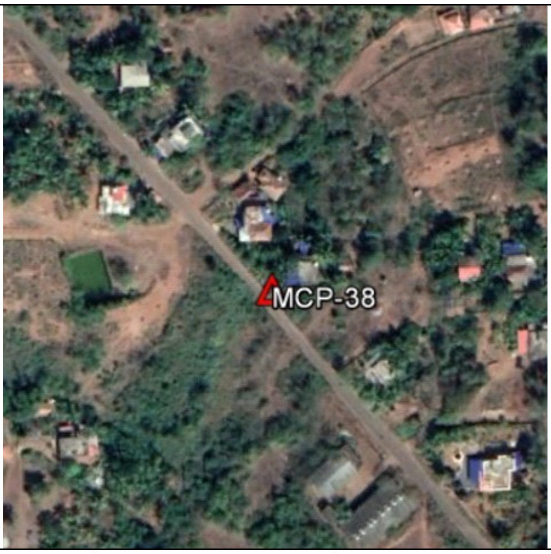
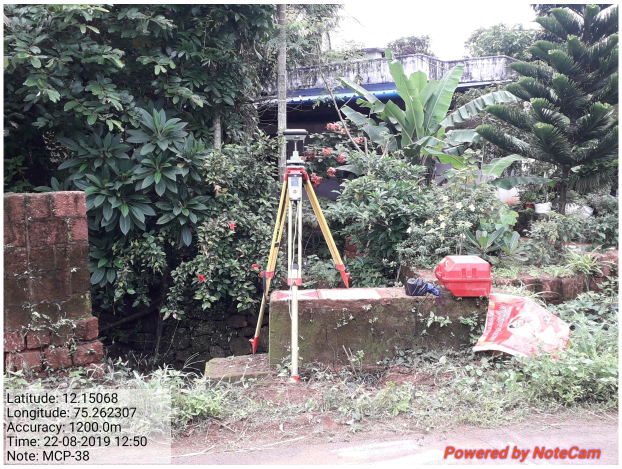
DGPS SURVEY REPORT

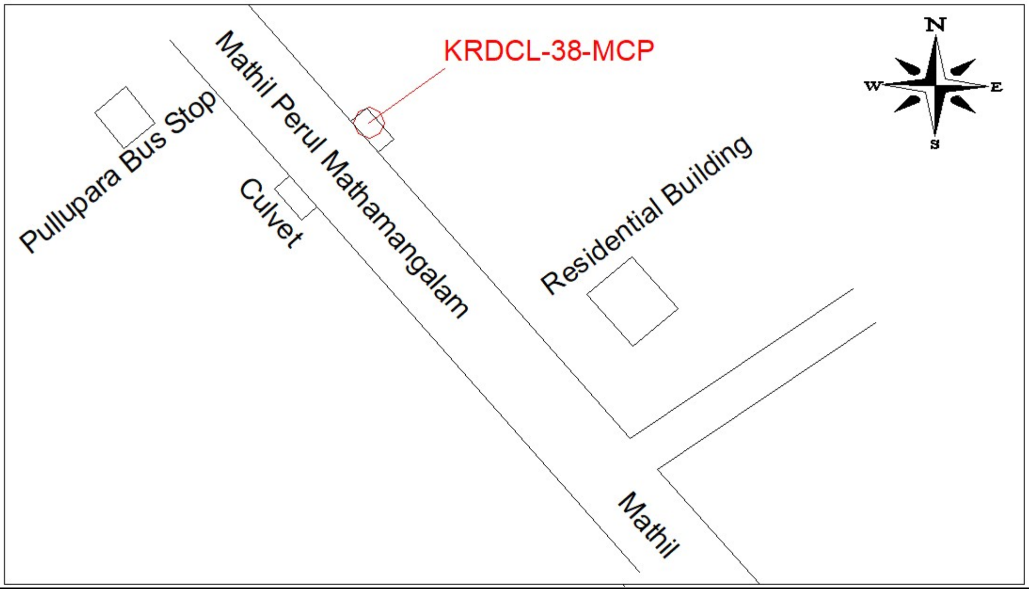
CLIENT	CONSULTANT	SURVEYED BY	DATE : 22-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-38-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
12° 08' 43.63963" N	75° 16' 08.44437" E	-52.134	529268.741	1342652.355	38.667

DESCRIPTION	The survey station, KRDCL-38-MCP is marked with red and white paint and nail point on the top of culvert on the side of the Mathil-Perul-Mathamangalam BT road. The survey station is near by Pullupura Bus stop. It is approximately 20 metres away from the residential building.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	 Latitude: 12.15068 Longitude: 75.262307 Accuracy: 1200.0m Time: 22-08-2019 12:50 Note: MCP-38 Powered by NoteCam



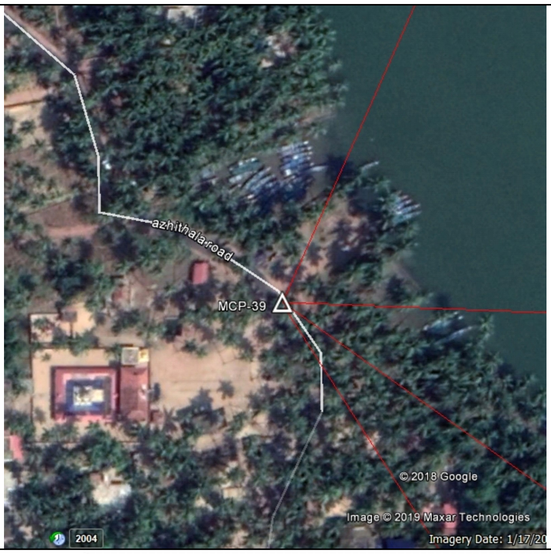
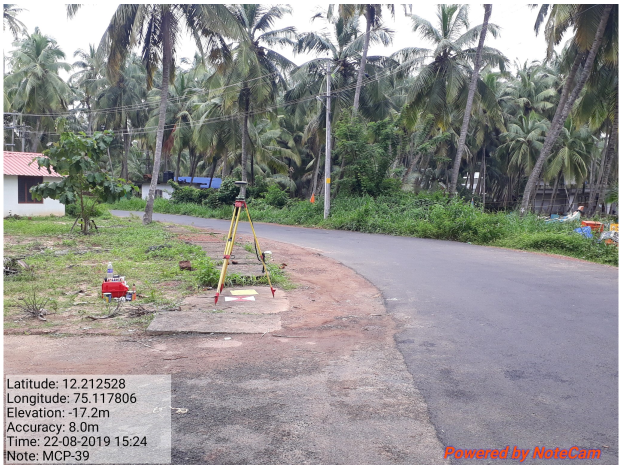
DGPS SURVEY REPORT

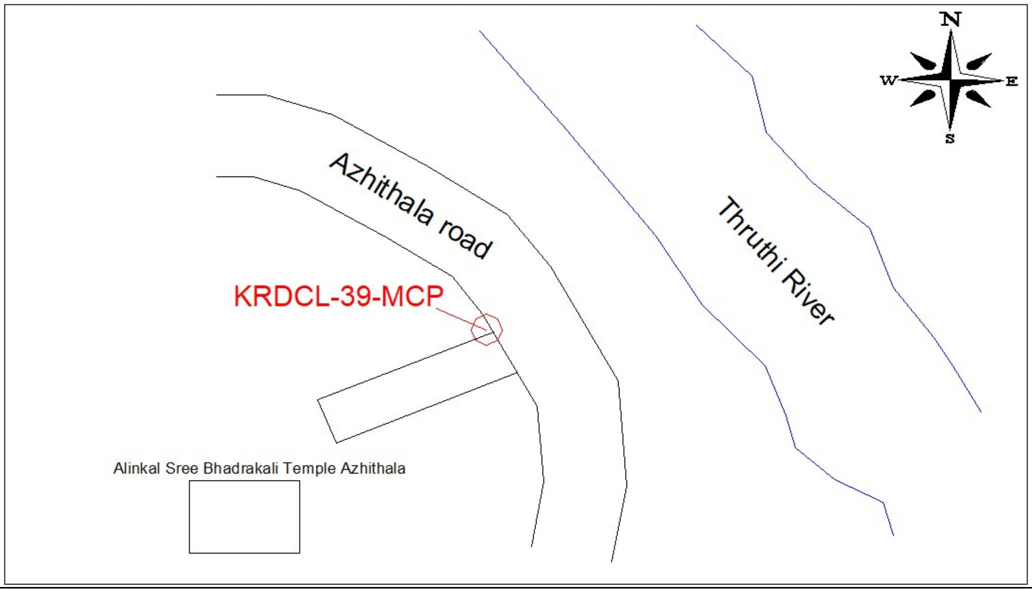
CLIENT	CONSULTANT	SURVEYED BY	DATE : 22-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-39-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
12° 12' 45.49015" N	75° 07' 03.61305" E	-87.639	512799.361	1350069.485	2.521

DESCRIPTION	The survey station, KRDCL-39-MCP is marked with red and white paint and nail point on the top of a concrete slab covering a drainage on the side of the Azhithala BT road. The survey station is near by Alinkal Sree Batrakali Temple. It is approximately 40 metres away from the commercial building.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	



DGPS SURVEY REPORT

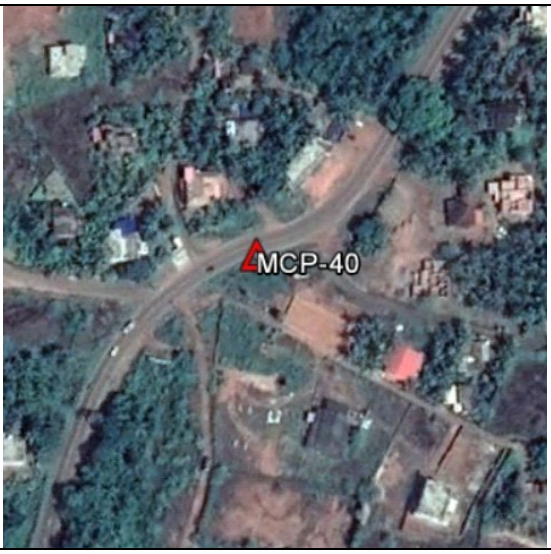
CLIENT	CONSULTANT	SURVEYED BY	DATE : 22-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID
			KRDCL-40-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

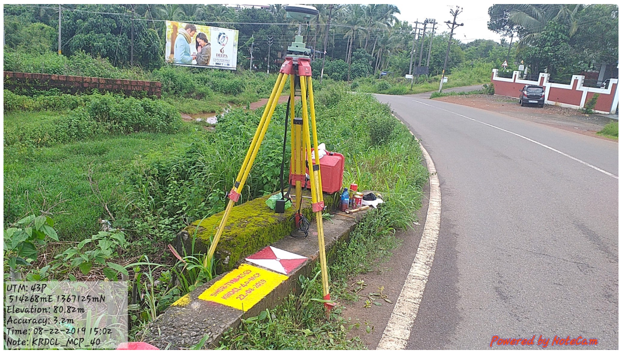
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
12° 22' 00.69401" N	75° 07' 52.45052" E	-10.728	514266.661	1367124.270	79.086

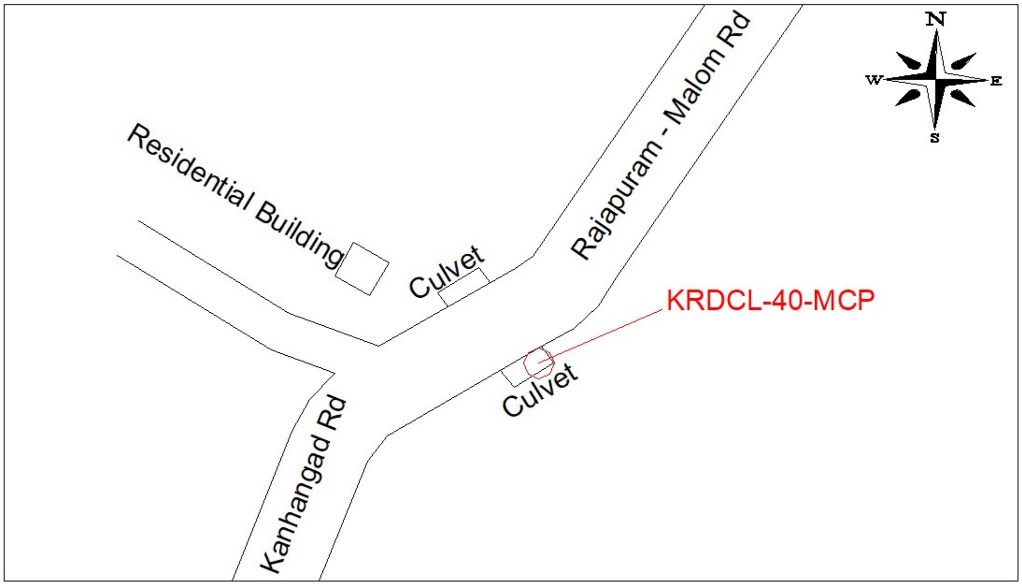
DESCRIPTION	The survey station, KRDCL-40-MCP is marked with red and white paint and nail point on the top of culvert on the side of the Kanhangad-Rajapuram-Malom BT road. The survey station is near by Residential building in Ambalathara. It is approximately 30 metres away from the road junction.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





DGPS SURVEY REPORT

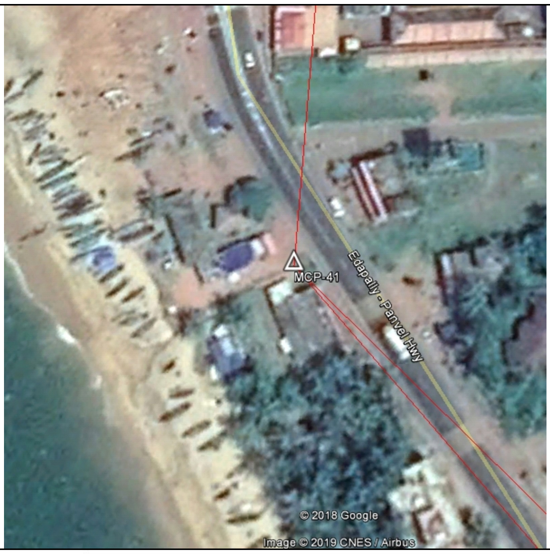
CLIENT	CONSULTANT	SURVEYED BY	DATE : 24-08-2019
KRDCL	SYSTRA	GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DGPS POINT ID KRDCL-41-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

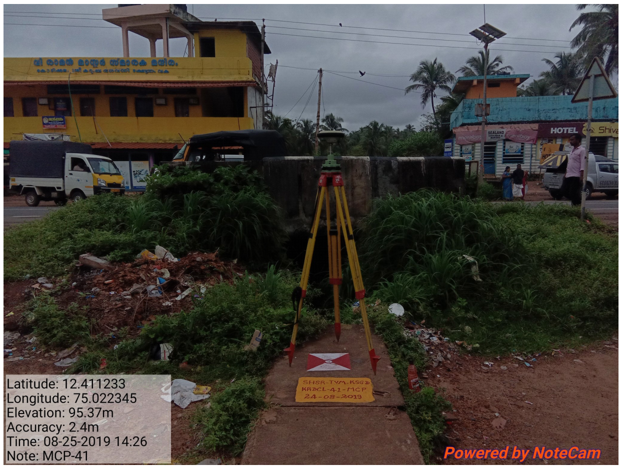
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
12° 24' 40.80018" N	75° 01' 20.54759" E	-84.921	502431.894	1372038.852	4.950

DESCRIPTION	The survey station, KRDCL-41-MCP is marked with red and white paint and nail point on the top of concrete slab covering a drinage on the side of the Kochi-Panvel Highway BT road. The survey station is near by Thikkannad Tyanbakeshwara Temple. It is approximately 10 metres away from the petty shop.

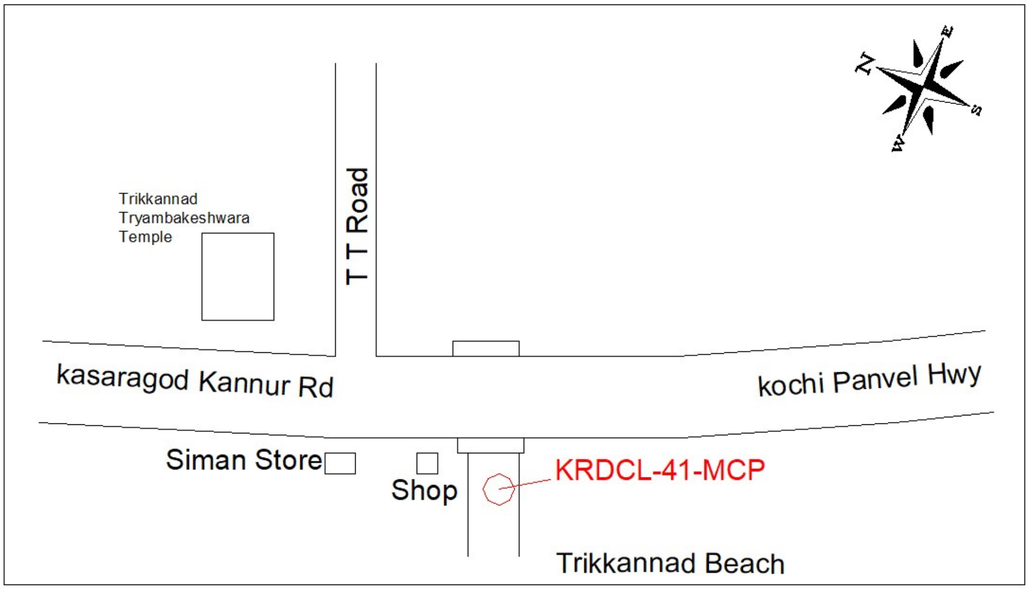
LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH



Latitude: 12.411233
Longitude: 75.022345
Elevation: 95.37m
Accuracy: 2.4m
Time: 08-25-2019 14:26
Note: MCP-41



DGPS SURVEY REPORT

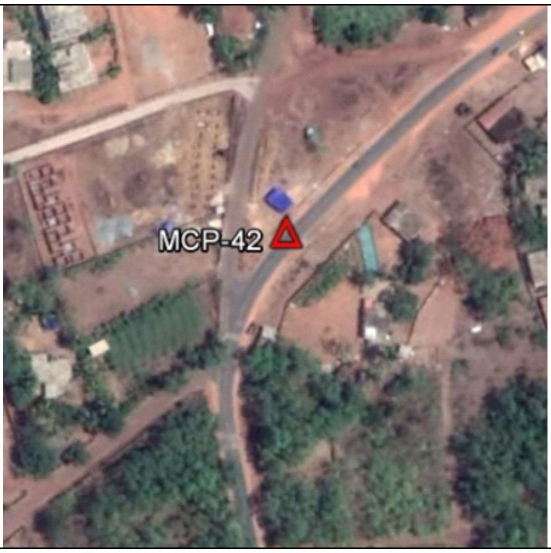
CLIENT	CONSULTANT	SURVEYED BY	DATE : 24-08-2019
			DGPS POINT ID
			KRDCL-42-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

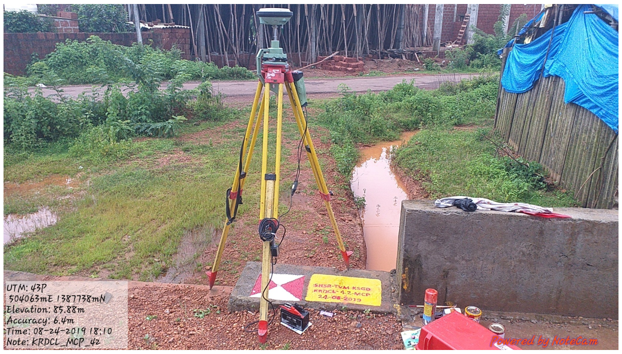
GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
12° 33' 11.97990" N	75° 02' 14.49401" E	-5.615	504058.432	1387741.047	84.340

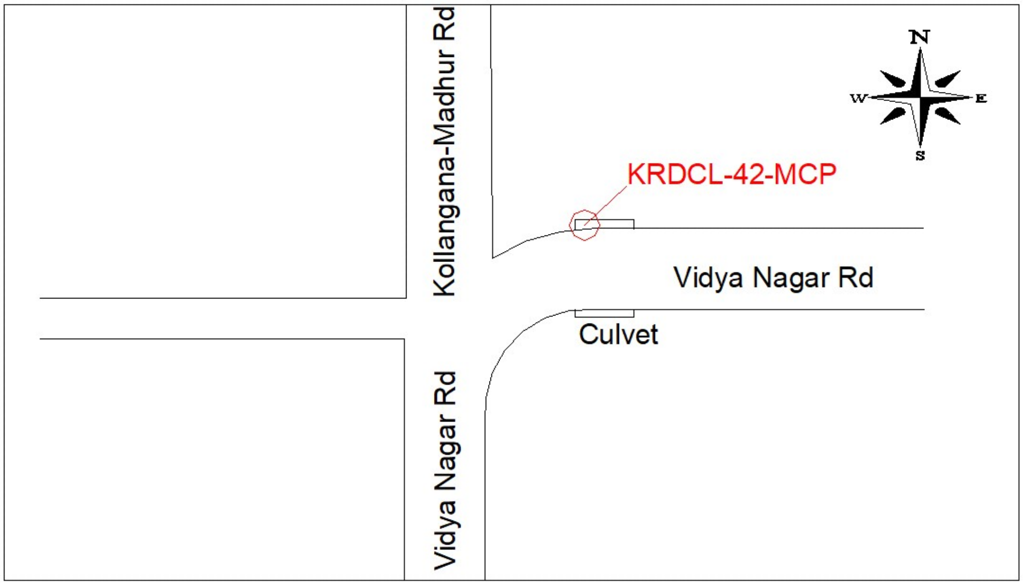
DESCRIPTION	The survey station, KRDCL-42-MCP is marked with red and white paint and nail point on the top of culvert on the side of Vidya Nagar BT road. The survey station is near by petty shop in Kollangana Village. It is approximately 100 metres away from the mosque.

LOCATION ON GOOGLE MAP



FIELD PHOTOGRAPH





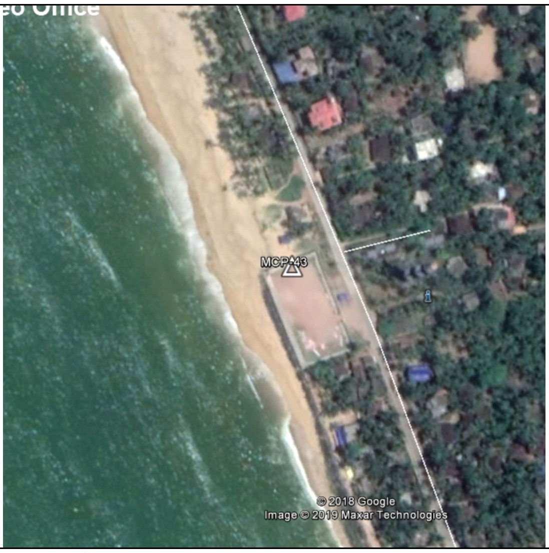
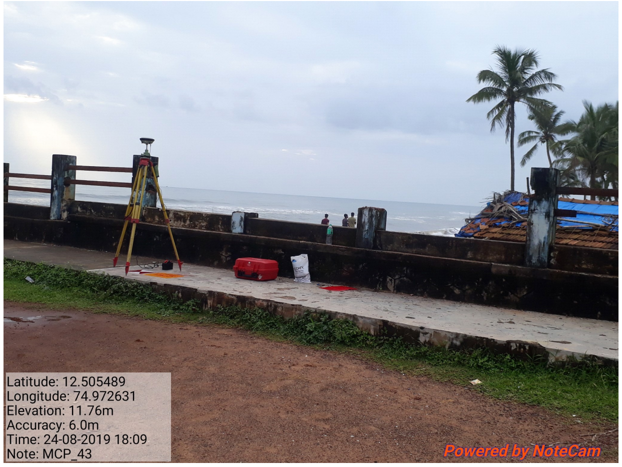
DGPS SURVEY REPORT

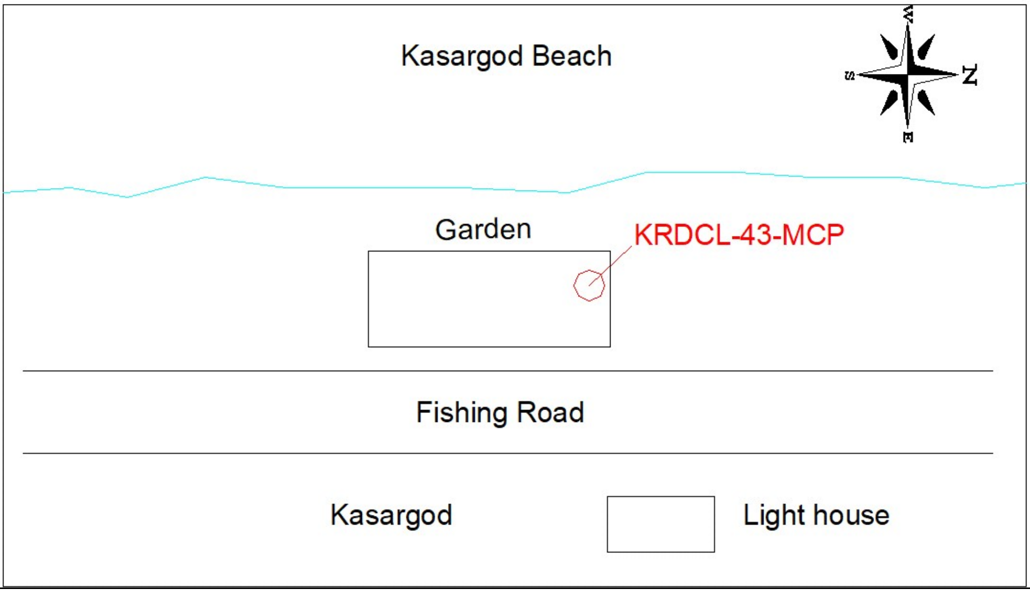
CLIENT KRDCL	CONSULTANT SYSTRA	SURVEYED BY GEO KNO VIRTUALIZING EARTH ANALYZING EARTH A GMR GROUP ENTERPRISE	DATE : 24-08-2019 DGPS POINT ID KRDCL-43-MCP

PROCESSED COORDINATES (UTM ZONE 43 NORTH, WGS 1984)

GEOGRAPHIC COORDINATES (DEG MIN SEC)			UTM COORDINATES (METERS)		
LATITUDE	LONGITUDE	ELLIPSOIDAL HEIGHT(m)	EASTING	NORTHING	ORTHOMETRIC HEIGHT(m)
12° 30' 19.90870" N	74° 58' 21.11705" E	-84.658	497015.602	1382455.350	5.275

DESCRIPTION	The survey station, KRDCL-43-MCP is marked with red and white paint and nail point on the top of foot path of a local park near the Kasargod Beach. The survey station is near by Kasargod Light house. It is approximately 20 metres away from the transformer.

LOCATION ON GOOGLE MAP	FIELD PHOTOGRAPH
	



LIST OF CO-ORDINATES OF MASTER CONTROL POINTS (MCP)

S. No.	Station ID	Latitude	Longitude	Ellip. Ht.	Easting	Northing	Ortho. Ht
1	MCP-01	8° 27' 23.87848" N	76° 56' 09.62072" E	-92.169	713141.204	935309.608	4.811
2	MCP-02	8° 36' 12.71456" N	76° 55' 11.98603" E	6.623	711297.215	951549.991	103.465
3	MCP-03	8° 38' 46.60508" N	76° 46' 36.62521" E	-93.204	695515.749	956202.028	3.653
4	MCP-04	8° 46' 32.85293" N	76° 51' 29.18127" E	-73.259	704390.419	970570.343	23.321
5	MCP-05	8° 48' 45.58120" N	76° 40' 29.44742" E	-92.113	684207.962	974553.220	4.376
6	MCP-06	8° 55' 23.77364" N	76° 44' 50.71556" E	-58.994	692134.854	986823.756	37.347
7	MCP-07	9° 02' 22.77509" N	76° 36' 45.15172" E	-74.868	677243.985	999628.814	20.987
8	MCP-08	9° 09' 41.60064" N	76° 43' 16.00636" E	-50.058	689116.882	1013165.762	45.903
9	MCP-09	9° 16' 07.89950" N	76° 35' 14.17187" E	-89.622	674353.732	1024965.979	5.907
10	MCP-10	9° 23' 43.34681" N	76° 41' 12.16972" E	-59.117	685213.252	1039009.253	36.724
11	MCP-11	9° 25' 45.32696" N	76° 32' 40.99547" E	-90.515	669601.127	1042684.875	5.024
12	MCP-12	9° 34' 26.65358" N	76° 37' 18.07719" E	-75.528	677978.904	1058739.819	20.266
13	MCP-13	9° 41' 35.17983" N	76° 28' 31.88151" E	-92.460	661877.078	1071832.473	3.096
14	MCP-14	9° 49' 41.33029" N	76° 33' 29.11278" E	-78.051	670868.251	1086808.590	17.655
15	MCP-15	9° 52' 40.42680" N	76° 22' 37.83494" E	-90.515	651002.129	1092223.695	4.964
16	MCP-16	10° 01' 25.34974" N	76° 27' 23.46937" E	-67.177	659632.646	1108386.980	28.604
17	MCP-17	10° 04' 54.32896" N	76° 20' 04.42484" E	-86.413	646237.838	1114750.149	9.217
18	MCP-18	10° 14' 52.58461" N	76° 23' 04.94961" E	-69.563	651655.268	1133151.913	26.191
19	MCP-19	10° 16' 19.62638" N	76° 12' 27.89788" E	-86.428	632261.534	1135747.719	8.980
20	MCP-20	10° 24' 47.33055" N	76° 16' 42.78293" E	-87.184	639953.733	1151374.367	8.386
21	MCP-21	10° 29' 52.98721" N	76° 09' 55.01630" E	-90.125	627518.700	1160716.003	5.044
22	MCP-22	10° 37' 59.81861" N	76° 12' 16.28850" E	-80.563	631755.971	1175687.422	14.418
23	MCP-23	10° 38' 15.71807" N	76° 00' 02.63029" E	-91.127	609460.213	1176096.639	3.236
24	MCP-24	10° 47' 20.74643" N	76° 05' 13.28921" E	-79.235	618841.057	1192870.915	15.139
25	MCP-25	10° 49' 50.20782" N	75° 54' 13.08117" E	-89.530	598776.177	1197396.741	4.327
26	MCP-26	10° 59' 14.93506" N	75° 58' 31.16273" E	-84.738	606557.328	1214768.179	8.949
27	MCP-27	11° 02' 05.98591" N	75° 51' 13.78517" E	-89.964	593267.785	1219981.997	3.362
28	MCP-28	11° 12' 16.91462" N	75° 51' 53.84522" E	-82.824	594428.769	1238751.705	10.337
29	MCP-29	11° 15' 47.23619" N	75° 46' 01.69426" E	-89.996	583732.147	1245182.605	3.109
30	MCP-30	11° 26' 49.93799" N	75° 47' 26.95800" E	-35.111	586262.096	1265545.989	57.727
31	MCP-31	11° 28' 24.28157" N	75° 38' 26.44258" E	-81.594	569877.471	1268403.309	11.386
32	MCP-32	11° 37' 17.90772" N	75° 40' 53.83912" E	-88.703	574304.244	1284805.041	4.117
33	MCP-33	11° 41' 50.24570" N	75° 32' 03.03284" E	-88.318	558214.746	1293135.987	4.680
34	MCP-34	11° 49' 52.43404" N	75° 32' 34.93724" E	-55.311	559151.972	1307949.151	37.297
35	MCP-35	11° 52' 17.10925" N	75° 21' 08.84128" E	-85.049	538386.341	1312359.780	7.390
36	MCP-36	11° 59' 19.68823" N	75° 22' 30.29054" E	-60.028	540832.897	1325343.178	31.942
37	MCP-37	12° 00' 38.04502" N	75° 12' 49.74779" E	-85.914	523275.266	1327731.269	5.577
38	MCP-38	12° 08' 43.63963" N	75° 16' 08.44437" E	-52.134	529268.741	1342652.355	38.667
39	MCP-39	12° 12' 45.49015" N	75° 07' 03.61305" E	-87.639	512799.361	1350069.485	2.521
40	MCP-40	12° 22' 00.69401" N	75° 07' 52.45052" E	-10.728	514266.661	1367124.270	79.086
41	MCP-41	12° 24' 40.80018" N	75° 01' 20.54759" E	-84.921	502431.894	1372038.852	4.950
42	MCP-42	12° 33' 11.97990" N	75° 02' 14.49401" E	-5.615	504058.432	1387741.047	84.340
43	MCP-43	12° 30' 19.90870" N	74° 58' 21.11705" E	-84.658	497015.602	1382455.350	5.275

LIST OF CO-ORDINATES OF SECONDARY CONTROL POINTS (SCP)

S. NO.	Station ID	Latitude	Longitude	Ellip. Ht.	Easting	Northing	MSL Ht.
1	SCP-1	8° 28' 53.77693" N	76° 55' 46.68898" E	-93.884	712425.956	938068.370	3.369
2	SCP-2	8° 30' 29.51542" N	76° 54' 08.53035" E	-93.725	709408.815	940995.198	3.535
3	SCP-3	8° 32' 33.19709" N	76° 52' 29.56120" E	-91.241	706363.127	944780.598	6.023
4	SCP-4	8° 35' 17.11208" N	76° 51' 14.15884" E	-87.178	704032.694	949805.752	10.125
5	SCP-5	8° 37' 06.84171" N	76° 49' 37.80450" E	-90.283	701070.033	953163.024	7.007
6	SCP-6	8° 39' 45.71540" N	76° 48' 15.29792" E	-84.832	698524.067	958032.336	12.414
7	SCP-7	8° 43' 08.21953" N	76° 48' 08.99306" E	-61.275	698301.716	964253.248	36.087
8	SCP-8	8° 46' 04.60906" N	76° 48' 24.74163" E	-43.629	698757.153	969675.042	53.540
9	SCP-9	8° 47' 38.88716" N	76° 47' 59.40061" E	-4.101	697968.699	972567.975	93.020
10	SCP-10	8° 49' 44.85657" N	76° 46' 43.06396" E	-53.540	695617.209	976427.145	43.584
11	SCP-11	8° 50' 48.19931" N	76° 44' 03.25990" E	-44.851	690724.603	978350.275	52.211
12	SCP-12	8° 51' 50.94586" N	76° 41' 12.15311" E	-90.488	685487.274	980254.015	6.447
13	SCP-13	8° 53' 54.97620" N	76° 39' 19.50968" E	-92.246	682028.403	984049.057	4.536
14	SCP-14	8° 56' 22.12595" N	76° 40' 02.50487" E	-81.156	683321.608	988575.783	15.586
15	SCP-15	8° 58' 23.91391" N	76° 41' 06.05759" E	-58.991	685245.959	992326.302	37.757
16	SCP-16	9° 01' 13.18394" N	76° 40' 44.78273" E	-68.157	684572.246	997523.803	28.502
17	SCP-17	9° 03' 44.93115" N	76° 40' 23.10328" E	-62.708	683888.702	1002182.885	33.862
18	SCP-18	9° 05' 39.63925" N	76° 40' 24.99028" E	-81.919	683930.082	1005707.328	14.605
19	SCP-19	9° 08' 49.51584" N	76° 39' 01.69970" E	-82.823	681360.076	1011529.190	13.561
20	SCP-20	9° 11' 35.24776" N	76° 38' 26.04447" E	-77.406	680248.236	1016615.943	18.917
21	SCP-21	9° 13' 58.52087" N	76° 38' 39.49975" E	-87.485	680638.758	1021019.573	8.847
22	SCP-021_A	9° 16' 40.42718" N	76° 39' 20.88033" E	-80.690	681878.731	1025999.661	15.685
23	SCP-022_A	9° 17' 55.74054" N	76° 38' 19.34402" E	-88.416	679989.956	1028304.791	7.933
24	SCP-22	9° 19' 41.88082" N	76° 38' 38.00969" E	-88.166	680544.452	1031568.369	8.137
25	SCP-023_A	9° 20' 21.15666" N	76° 38' 19.70010" E	-85.534	679980.125	1032772.441	10.766
26	SCP-23	9° 22' 56.30062" N	76° 38' 09.22296" E	-89.758	679638.278	1037537.429	6.556
27	SCP-24	9° 26' 01.29567" N	76° 37' 42.91786" E	-85.535	678809.275	1043217.277	10.802
29	SCP-25	9° 28' 18.35264" N	76° 37' 47.88540" E	-64.296	678941.137	1047428.778	32.072
28	SCP-26	9° 26' 39.56083" N	76° 37' 11.15064" E	-65.141	677834.729	1044388.385	31.198
31	SCP-026_A	9° 29' 28.04162" N	76° 37' 13.35637" E	-45.715	677877.929	1049564.905	50.660
30	SCP-27	9° 28' 49.74925" N	76° 35' 57.96725" E	-67.312	675583.912	1048377.808	29.026
33	SCP-027_A	9° 31' 29.59052" N	76° 35' 57.95505" E	-81.083	675560.902	1053288.544	15.298
32	SCP-28	9° 31' 28.36756" N	76° 33' 44.49403" E	-93.019	671490.854	1053232.383	3.261
34	SCP-028_A	9° 32' 28.23383" N	76° 35' 20.94434" E	-78.165	674423.885	1055085.014	18.209
35	SCP-29	9° 33' 32.85471" N	76° 32' 23.50950" E	-76.635	669004.022	1057045.789	19.606
37	SCP-029_A	9° 35' 21.41954" N	76° 34' 18.36883" E	-86.671	672491.324	1060396.950	9.684
36	SCP-30	9° 35' 19.55435" N	76° 32' 11.92100" E	-68.811	668636.019	1060322.221	27.423
38	SCP-030_A	9° 37' 02.99232" N	76° 34' 00.16587" E	-90.550	671922.049	1063514.965	5.802
39	SCP-31	9° 38' 28.08469" N	76° 33' 55.33107" E	-87.599	671762.691	1066128.527	8.757
40	SCP-32	9° 40' 15.15576" N	76° 34' 16.41091" E	-84.501	672390.215	1069420.958	11.888

S. NO.	Station ID	Latitude	Longitude	Ellip. Ht.	Easting	Northing	MSL Ht.
41	SCP-33	9° 42' 35.28308" N	76° 33' 18.39844" E	-65.426	670602.083	1073717.881	30.908
42	SCP-34	9° 45' 22.03899" N	76° 32' 13.87446" E	-66.555	668612.127	1078832.019	29.715
43	SCP-35	9° 47' 02.11412" N	76° 30' 55.63209" E	-84.976	666213.819	1081895.747	11.205
44	SCP-36	9° 49' 06.92955" N	76° 30' 05.36814" E	-86.980	664665.010	1085723.439	9.177
45	SCP-37	9° 50' 28.96826" N	76° 29' 10.23248" E	-90.450	662973.877	1088236.327	5.667
46	SCP-38	9° 54' 25.17112" N	76° 27' 02.76161" E	-83.857	659058.664	1095475.743	12.248
47	SCP-39	9° 54' 56.44304" N	76° 25' 45.68106" E	-45.700	656706.593	1096426.291	50.376
48	SCP-40	9° 56' 50.67008" N	76° 22' 35.88456" E	-91.555	650910.912	1099911.005	4.449
49	SCP-41	10° 00' 04.25570" N	76° 22' 08.87198" E	-92.289	650063.588	1105854.616	3.757
50	SCP-42	10° 01' 45.73762" N	76° 23' 09.79658" E	-90.670	651905.710	1108979.951	5.442
51	SCP-43	10° 05' 20.24499" N	76° 23' 57.08273" E	-69.450	653317.410	1115575.898	26.772
52	SCP-44	10° 07' 29.09765" N	76° 22' 58.93366" E	-88.073	651530.386	1119526.816	8.092
53	SCP-45	10° 09' 42.25275" N	76° 22' 48.55278" E	-87.545	651197.037	1123616.104	8.622
54	SCP-46	10° 10' 45.85100" N	76° 22' 43.88778" E	-70.984	651046.747	1125569.290	25.180
55	SCP-47	10° 12' 59.02808" N	76° 20' 21.00824" E	-82.525	646681.356	1129642.308	13.471
56	SCP-48	10° 14' 46.90181" N	76° 18' 16.28319" E	-88.255	642872.509	1132940.658	7.759
57	SCP-49	10° 16' 46.88300" N	76° 17' 32.39052" E	-75.470	641522.156	1136621.089	20.482
58	SCP-50	10° 18' 25.96677" N	76° 17' 13.72049" E	-73.672	640941.917	1139662.655	22.313
59	SCP-51	10° 20' 32.83664" N	76° 15' 31.04246" E	-84.207	637802.977	1143547.638	11.685
60	SCP-52	10° 23' 10.27888" N	76° 14' 11.53301" E	-89.118	635365.711	1148374.731	6.729
61	SCP-53	10° 25' 46.80267" N	76° 11' 55.76643" E	-89.072	631218.460	1153167.191	6.630
62	SCP-54	10° 28' 11.28753" N	76° 12' 30.46751" E	-79.938	632256.692	1157609.687	15.740
63	SCP-55	10° 31' 28.84681" N	76° 12' 28.28800" E	-82.834	632167.112	1163678.344	12.749
64	SCP-56	10° 34' 19.88089" N	76° 11' 33.46511" E	-82.892	630480.507	1168926.027	12.564
65	SCP-57	10° 35' 10.55074" N	76° 10' 22.09677" E	-84.212	628305.451	1170474.348	11.179
66	SCP-58	10° 37' 20.59949" N	76° 07' 34.68175" E	-68.588	623202.789	1174450.533	26.616
67	SCP-59	10° 39' 30.73437" N	76° 05' 08.00441" E	-79.195	618731.455	1178432.217	15.842
68	SCP-60	10° 41' 55.05347" N	76° 03' 31.87989" E	-84.420	615795.538	1182855.343	10.505
69	SCP-61	10° 43' 56.61563" N	76° 02' 28.09837" E	-89.863	613845.193	1186582.922	4.982
70	SCP-62	10° 47' 05.90443" N	76° 01' 00.82294" E	-85.317	611174.749	1192388.640	9.426
71	SCP-63	10° 50' 32.06577" N	75° 59' 42.03098" E	-84.911	608761.069	1198713.637	9.625
72	SCP-64	10° 53' 02.11983" N	75° 57' 29.10603" E	-84.478	604710.188	1203310.020	9.837
73	SCP-65	10° 54' 54.27208" N	75° 55' 25.00174" E	-85.049	600931.737	1206743.378	9.130
74	SCP-66	10° 57' 08.37703" N	75° 53' 55.43890" E	-83.851	598200.554	1210854.548	10.111
75	SCP-67	10° 58' 50.75562" N	75° 52' 47.99522" E	-86.988	596144.193	1213993.307	6.817
76	SCP-68	11° 00' 46.23612" N	75° 52' 17.86972" E	-84.640	595219.566	1217537.897	9.056
77	SCP-69	11° 03' 31.71047" N	75° 51' 20.43083" E	-84.949	593461.912	1222615.801	8.596
78	SCP-70	11° 06' 47.30173" N	75° 50' 21.70291" E	-85.745	591663.030	1228618.773	7.565
79	SCP-71	11° 08' 13.56771" N	75° 49' 37.15458" E	-89.936	590304.193	1231264.839	3.266
80	SCP-72	11° 11' 15.52180" N	75° 49' 31.38006" E	-77.969	590113.439	1236853.492	15.081

S. NO.	Station ID	Latitude	Longitude	Ellip. Ht.	Easting	Northing	MSL Ht.
81	SCP-73	11° 13' 13.25098" N	75° 47' 35.73999" E	-83.534	586596.465	1240460.187	9.341
82	SCP-74	11° 15' 23.24437" N	75° 46' 38.69849" E	-78.035	584856.099	1244448.598	14.706
83	SCP-75	11° 17' 30.62263" N	75° 45' 44.81325" E	-86.094	583212.037	1248357.004	6.629
84	SCP-76	11° 20' 40.70769" N	75° 44' 27.69961" E	-88.253	580859.307	1254189.851	4.437
85	SCP-77	11° 23' 03.50999" N	75° 43' 51.98245" E	-88.905	579765.617	1258573.585	3.734
86	SCP-78	11° 25' 29.24042" N	75° 42' 29.39952" E	-75.528	577251.774	1263043.785	17.049
87	SCP-79	11° 27' 24.32359" N	75° 41' 00.27194" E	-85.616	574542.550	1266572.292	6.925
88	SCP-80	11° 29' 49.41826" N	75° 38' 34.49752" E	-90.373	570115.675	1271018.980	2.098
89	SCP-81	11° 31' 15.51663" N	75° 37' 51.03564" E	-81.624	568793.176	1273660.729	10.821
90	SCP-82	11° 35' 13.68492" N	75° 37' 19.11743" E	-81.059	567810.381	1280974.394	11.379
91	SCP-83	11° 36' 30.75283" N	75° 36' 29.26569" E	-86.743	566295.546	1283338.423	5.684
92	SCP-84	11° 38' 50.38666" N	75° 34' 31.61559" E	-84.201	562724.058	1287620.115	8.268
93	SCP-85	11° 40' 39.61486" N	75° 33' 16.36739" E	-84.742	560439.073	1290970.712	7.726
94	SCP-86	11° 43' 55.12238" N	75° 32' 39.56581" E	-74.253	559313.317	1296973.908	18.185
95	SCP-87	11° 46' 57.27225" N	75° 31' 49.63699" E	-78.583	557791.445	1302566.088	13.778
96	SCP-88	11° 48' 35.24870" N	75° 30' 42.66280" E	-81.347	555759.055	1305571.848	10.916
97	SCP-89	11° 49' 33.55255" N	75° 28' 27.25584" E	-69.925	551658.509	1307355.533	22.310
98	SCP-90	11° 50' 43.85768" N	75° 25' 42.96835" E	-85.597	546684.059	1309507.037	6.557
99	SCP-91	11° 51' 56.49543" N	75° 24' 26.51568" E	-87.104	544367.611	1311734.752	4.976
100	SCP-92	11° 52' 32.34467" N	75° 21' 52.67151" E	-82.567	539711.744	1312829.465	9.498
101	SCP-93	11° 55' 40.98403" N	75° 20' 49.53376" E	-88.671	537794.401	1318621.351	3.221
102	SCP-94	11° 58' 49.20069" N	75° 19' 04.01495" E	-86.530	534596.121	1324398.872	5.112
103	SCP-95	11° 59' 55.02599" N	75° 17' 27.20650" E	-89.259	531666.383	1326417.565	2.279
104	SCP-96	12° 01' 44.10099" N	75° 15' 56.99987" E	-83.261	528935.378	1329765.207	8.088
105	SCP-97	12° 03' 51.34345" N	75° 14' 13.84636" E	-87.288	525813.085	1333670.793	3.832
106	SCP-98	12° 05' 49.19322" N	75° 11' 35.83896" E	-87.107	521033.705	1337286.970	3.801
107	SCP-99	12° 07' 44.14403" N	75° 10' 44.27378" E	-84.780	519472.682	1340816.796	5.936
108	SCP-100	12° 10' 21.70417" N	75° 10' 30.88163" E	-83.298	519064.797	1345656.243	7.159
109	SCP-101	12° 12' 40.11799" N	75° 09' 22.51781" E	-85.879	516996.437	1349906.592	4.381
110	SCP-102	12° 15' 17.12924" N	75° 08' 12.82768" E	-78.899	514888.309	1354728.323	11.168
111	SCP-103	12° 16' 15.44189" N	75° 06' 44.21772" E	-74.377	512210.656	1356518.263	15.633
112	SCP-104	12° 19' 24.81881" N	75° 05' 00.23408" E	-83.229	509067.700	1362334.178	6.689
113	SCP-105	12° 21' 55.57175" N	75° 03' 39.03322" E	-77.797	506614.211	1366964.183	12.111
114	SCP-106	12° 24' 01.62335" N	75° 01' 59.09175" E	-72.300	503595.769	1370835.577	17.717
115	SCP-107	12° 26' 04.47881" N	75° 01' 25.69781" E	-69.892	502587.160	1374609.228	20.199
116	SCP-108	12° 28' 35.38443" N	74° 59' 45.12183" E	-87.763	499550.910	1379244.504	2.379

LIST OF CO-ORDINATES OF CHECK POINTS

S.no	Point ID	Lattitude	Longitude	Easting	Northing	Elevation
1	CP_01	76° 53' 50.8921" E	8° 30' 50.9098" N	708866.073	941649.908	5.626
2	CP_02	76° 53' 20.3148" E	8° 31' 18.0911" N	707926.714	942480.494	9.687
3	CP_03	76° 52' 58.7270" E	8° 31' 41.2176" N	707262.954	943187.845	5.616
4	CP_04	76° 52' 40.4085" E	8° 32' 12.5861" N	706697.972	944148.931	5.714
5	CP_05	76° 52' 26.4631" E	8° 32' 42.1319" N	706267.038	945054.663	7.718
6	CP_06	76° 52' 22.7740" E	8° 33' 16.0143" N	706149.147	946095.165	10.322
7	CP_07	76° 52' 18.9353" E	8° 33' 47.9967" N	706026.964	947077.267	10.321
8	CP_08	76° 52' 07.1089" E	8° 34' 11.6285" N	705661.750	947801.604	10.047
9	CP_09	76° 51' 45.1581" E	8° 34' 37.4604" N	704986.591	948592.035	9.786
10	CP_10	76° 51' 27.1425" E	8° 35' 07.0361" N	704431.244	949498.088	10.267
11	CP_11	76° 51' 03.6523" E	8° 35' 33.7005" N	703708.937	950313.881	10.436
12	CP_12	76° 50' 37.4130" E	8° 36' 00.9987" N	702902.494	951148.752	8.443
13	CP_13	76° 50' 16.4216" E	8° 36' 23.9161" N	702257.204	951849.799	8.805
14	CP_14	76° 49' 51.8769" E	8° 36' 45.3861" N	701503.495	952505.864	10.320
15	CP_15	76° 49' 24.1443" E	8° 37' 15.1108" N	700651.120	953415.093	5.219
16	CP_16	76° 49' 09.2338" E	8° 37' 40.9744" N	700191.408	954207.571	9.574
17	CP_17	76° 48' 51.0168" E	8° 38' 09.4454" N	699630.229	955079.677	39.307
18	CP_18	76° 48' 36.2781" E	8° 38' 50.3940" N	699173.598	956335.663	5.809
19	CP_19	76° 48' 19.6924" E	8° 39' 25.4597" N	698661.378	957410.629	2.512
20	CP_20	76° 47' 59.6836" E	8° 40' 25.4777" N	698040.891	959251.747	6.835
21	CP_21	76° 47' 53.5700" E	8° 41' 09.7505" N	697847.533	960611.113	8.550
22	CP_22	76° 47' 56.1754" E	8° 41' 41.9729" N	697922.488	961601.505	4.087
23	CP_23	76° 47' 53.3307" E	8° 42' 20.3196" N	697829.926	962779.270	38.932
24	CP_24	76° 48' 06.6738" E	8° 42' 49.2184" N	698233.601	963669.109	30.828
25	CP_25	76° 48' 11.5033" E	8° 43' 22.6439" N	698376.339	964696.796	17.550
26	CP_26	76° 48' 21.5532" E	8° 43' 54.5750" N	698678.860	965679.333	39.506
27	CP_27	76° 48' 24.0187" E	8° 44' 27.1287" N	698749.436	966679.891	18.751
28	CP_28	76° 48' 27.3557" E	8° 44' 59.6233" N	698846.649	967678.764	39.520
29	CP_29	76° 48' 27.5411" E	8° 45' 34.4901" N	698847.169	968750.060	43.773
30	CP_30	76° 48' 29.5674" E	8° 46' 03.5112" N	698904.816	969642.019	53.539
31	CP_31	76° 48' 19.4469" E	8° 46' 39.0204" N	698590.234	970731.539	54.336
32	CP_32	76° 48' 11.9744" E	8° 47' 11.2566" N	698357.080	971720.886	74.153
33	CP_33	76° 48' 01.6163" E	8° 47' 42.3177" N	698035.912	972673.702	94.743
34	CP_34	76° 47' 50.7688" E	8° 48' 09.1382" N	697700.422	973496.156	86.570
35	CP_35	76° 47' 41.7362" E	8° 48' 47.2961" N	697418.738	974667.213	88.378
36	CP_36	76° 47' 09.5158" E	8° 49' 17.4507" N	696429.605	975588.977	48.989
37	CP_37	76° 46' 42.3651" E	8° 49' 44.2030" N	695595.946	976406.964	46.438
38	CP_38	76° 46' 16.8673" E	8° 49' 56.1488" N	694814.995	976770.281	46.251
39	CP_39	76° 45' 47.6730" E	8° 50' 04.4546" N	693921.623	977021.243	25.179
40	CP_40	76° 45' 17.7135" E	8° 50' 17.0903" N	693004.256	977405.141	45.709
41	CP_41	76° 44' 45.5830" E	8° 50' 32.2333" N	692020.209	977865.780	26.045
42	CP_42	76° 44' 03.5685" E	8° 50' 47.9415" N	690734.070	978342.399	52.422
43	CP_43	76° 42' 59.8147" E	8° 50' 56.4799" N	688784.690	978595.701	25.067
44	CP_44	76° 43' 34.7235" E	8° 50' 57.7196" N	689851.237	978638.720	35.412
45	CP_45	76° 42' 31.5925" E	8° 51' 11.4486" N	687920.184	979051.620	8.424
46	CP_46	76° 42' 10.8527" E	8° 51' 23.3211" N	687284.774	979413.474	12.638
47	CP_47	76° 41' 41.6423" E	8° 51' 33.5614" N	686390.772	979724.010	2.734
48	CP_48	76° 41' 14.7952" E	8° 51' 50.6421" N	685568.046	980245.051	5.124
49	CP_49	76° 40' 38.7365" E	8° 52' 15.3216" N	684462.829	980998.284	10.027
50	CP_50	76° 40' 16.5103" E	8° 52' 32.7437" N	683781.300	981530.476	26.004
51	CP_51	76° 39' 48.5806" E	8° 52' 57.0806" N	682924.572	982274.337	6.333
52	CP_52	76° 39' 31.7645" E	8° 53' 30.8083" N	682406.142	983308.234	4.427

53	CP_53	76° 39' 21.3317" E	8° 53' 57.9646" N	682083.660	984141.116	4.966
54	CP_54	76° 39' 17.9879" E	8° 54' 35.6307" N	681976.322	985297.854	6.784
55	CP_55	76° 39' 24.2497" E	8° 55' 05.8843" N	682163.464	986228.178	6.912
56	CP_56	76° 39' 43.7752" E	8° 55' 33.7522" N	682756.129	987087.032	9.365
57	CP_57	76° 39' 57.7648" E	8° 56' 13.1445" N	683178.051	988299.195	24.531
58	CP_58	76° 40' 17.7738" E	8° 56' 54.7081" N	683783.520	989578.910	18.913
59	CP_59	76° 40' 29.1470" E	8° 57' 29.6815" N	684126.063	990654.971	37.755
60	CP_60	76° 40' 59.7814" E	8° 57' 42.2889" N	685060.101	991046.580	45.875
61	CP_61	76° 40' 37.1141" E	8° 58' 06.7204" N	684364.250	991794.022	7.340
62	CP_62	76° 41' 10.1146" E	8° 58' 22.9008" N	685370.029	992295.746	41.787
63	CP_63	76° 40' 49.4832" E	8° 58' 34.9878" N	684738.113	992664.205	44.766
64	CP_64	76° 41' 05.2507" E	8° 59' 01.1393" N	685216.061	993469.866	12.143
65	CP_65	76° 41' 14.6596" E	8° 59' 30.0636" N	685499.374	994359.831	10.248
66	CP_66	76° 41' 01.8539" E	9° 00' 04.7201" N	685103.329	995422.785	5.185
67	CP_67	76° 40' 57.7445" E	9° 00' 36.5071" N	684973.319	996398.801	17.878
68	CP_68	76° 40' 47.9841" E	9° 01' 10.8426" N	684670.356	997452.318	35.749
69	CP_69	76° 40' 31.5918" E	9° 01' 50.1493" N	684164.151	998657.637	5.028
70	CP_70	76° 40' 24.0743" E	9° 02' 28.0774" N	683929.209	999821.848	32.112
71	CP_71	76° 40' 14.3468" E	9° 03' 02.6076" N	683627.260	1000881.352	23.632
72	CP_72	76° 40' 24.6971" E	9° 03' 33.8023" N	683938.948	1001841.197	23.933
73	CP_73	76° 40' 30.4748" E	9° 04' 07.3834" N	684110.643	1002873.721	25.916
74	CP_74	76° 40' 28.0595" E	9° 04' 39.2025" N	684032.375	1003850.961	37.594
75	CP_75	76° 40' 35.4103" E	9° 05' 14.8048" N	684251.798	1004945.807	18.301
76	CP_76	76° 40' 25.9496" E	9° 05' 53.3914" N	683957.423	1006129.971	22.952
77	CP_77	76° 39' 57.4887" E	9° 06' 35.8816" N	683082.341	1007431.388	16.729
78	CP_78	76° 39' 41.3502" E	9° 07' 01.7471" N	682585.905	1008223.784	12.398
79	CP_79	76° 39' 34.5836" E	9° 07' 30.4305" N	682375.246	1009104.072	17.941
80	CP_80	76° 39' 15.2366" E	9° 08' 05.5262" N	681779.576	1010179.599	11.123
81	CP_81	76° 39' 04.4340" E	9° 08' 38.3692" N	681445.127	1011187.115	21.917
82	CP_82	76° 38' 49.7418" E	9° 09' 15.0909" N	680991.393	1012313.255	21.767
83	CP_83	76° 38' 34.0377" E	9° 09' 41.7403" N	680508.199	1013129.806	31.371
84	CP_84	76° 38' 20.5167" E	9° 10' 11.9254" N	680091.177	1014055.286	34.849
85	CP_85	76° 38' 15.2893" E	9° 10' 43.0603" N	679927.229	1015011.105	26.638
86	CP_86	76° 38' 24.3005" E	9° 11' 16.3800" N	680197.648	1016036.032	19.332
87	CP_87	76° 38' 28.5107" E	9° 11' 48.7976" N	680321.617	1017032.574	19.256
88	CP_88	76° 38' 27.0039" E	9° 12' 25.6424" N	680270.433	1018164.338	5.004
89	CP_89	76° 38' 41.8311" E	9° 13' 24.0839" N	680714.793	1019961.899	7.690
90	CP_90	76° 38' 39.1629" E	9° 13' 58.4790" N	680628.482	1021018.239	8.691
91	CP_91	76° 38' 39.8439" E	9° 14' 37.8715" N	680643.692	1022228.584	8.083
92	CP_92	76° 38' 40.8823" E	9° 15' 06.3755" N	680671.345	1023104.453	9.087
93	CP_93	76° 38' 19.9737" E	9° 15' 28.9535" N	680029.976	1023795.171	25.570
94	CP_94	76° 38' 55.0543" E	9° 15' 36.9913" N	681099.553	1024047.060	13.136
95	CP_95	76° 38' 12.9523" E	9° 15' 59.6955" N	679811.327	1024738.664	55.588
96	CP_96	76° 39' 08.3548" E	9° 16' 20.4245" N	681499.308	1025383.338	14.971
97	CP_97	76° 38' 10.5009" E	9° 16' 35.3175" N	679731.472	1025832.726	20.277
98	CP_98	76° 39' 26.8729" E	9° 16' 52.7343" N	682059.862	1026378.627	27.597
99	CP_99	76° 39' 34.2948" E	9° 17' 17.1573" N	682282.868	1027130.034	17.459
100	CP_100	76° 38' 13.7372" E	9° 17' 27.6818" N	679822.826	1027441.957	50.392
101	CP_101	76° 39' 34.7513" E	9° 17' 54.1566" N	682291.482	1028266.834	7.714
102	CP_102	76° 38' 10.5616" E	9° 18' 14.6261" N	679719.253	1028883.772	14.351
103	CP_103	76° 39' 03.9552" E	9° 18' 23.1642" N	681347.483	1029153.645	7.556
104	CP_104	76° 38' 50.2390" E	9° 18' 52.1799" N	680924.749	1030043.145	18.353
105	CP_105	76° 38' 30.9361" E	9° 19' 42.0882" N	680328.568	1031573.736	8.134

106	CP_106	76° 38' 38.6470" E	9° 20' 13.4691" N	680559.381	1032538.946	5.210
107	CP_107	76° 38' 37.2926" E	9° 20' 51.6418" N	680512.589	1033711.531	5.176
108	CP_108	76° 38' 39.5405" E	9° 21' 25.1229" N	680576.383	1034740.490	8.062
109	CP_109	76° 38' 32.8934" E	9° 21' 58.2563" N	680368.812	1035757.502	8.067
110	CP_110	76° 38' 17.3248" E	9° 22' 29.5212" N	679889.305	1036715.838	5.709
111	CP_111	76° 37' 59.4136" E	9° 23' 13.1820" N	679336.575	1038054.680	6.939
112	CP_112	76° 38' 01.1236" E	9° 23' 48.0897" N	679383.757	1039127.391	20.418
113	CP_113	76° 37' 40.7947" E	9° 24' 35.0563" N	678756.832	1040567.454	6.755
114	CP_114	76° 37' 32.7335" E	9° 25' 10.4895" N	678505.844	1041654.920	5.898
115	CP_115	76° 37' 20.4820" E	9° 25' 42.0936" N	678127.581	1042624.151	7.807
116	CP_116	76° 37' 36.6594" E	9° 26' 07.4247" N	678617.477	1043404.689	12.824
117	CP_117	76° 37' 46.0425" E	9° 26' 45.3591" N	678898.280	1044571.479	26.584
118	CP_118	76° 36' 53.4272" E	9° 27' 07.3736" N	677290.120	1045240.364	19.245
119	CP_119	76° 37' 55.8059" E	9° 27' 32.1993" N	679189.378	1046011.941	27.351
120	CP_120	76° 36' 23.4790" E	9° 27' 59.0573" N	676369.252	1046824.004	40.496
121	CP_121	76° 37' 32.7470" E	9° 28' 37.9031" N	678476.567	1048027.264	28.183
122	CP_122	76° 35' 58.2043" E	9° 28' 49.7340" N	675591.144	1048377.374	29.035
123	CP_123	76° 35' 06.1007" E	9° 29' 54.7108" N	673992.799	1050366.337	37.397
124	CP_124	76° 36' 53.4455" E	9° 29' 58.1151" N	677266.331	1050486.017	32.643
125	CP_125	76° 34' 14.8983" E	9° 30' 40.1911" N	672424.811	1051756.492	16.826
126	CP_126	76° 36' 14.1830" E	9° 30' 58.3189" N	676060.267	1052330.085	11.908
127	CP_127	76° 33' 27.0552" E	9° 31' 55.2675" N	670955.300	1054056.407	18.554
128	CP_128	76° 35' 37.2720" E	9° 32' 07.8228" N	674924.708	1054460.229	5.439
129	CP_129	76° 32' 40.5706" E	9° 32' 59.2290" N	669528.905	1056015.069	13.071
130	CP_130	76° 34' 50.0624" E	9° 33' 19.5403" N	673474.894	1056656.951	19.852
131	CP_131	76° 32' 15.6536" E	9° 33' 42.7461" N	668763.110	1057348.603	10.904
132	CP_132	76° 34' 40.0341" E	9° 33' 57.2596" N	673163.781	1057814.379	9.261
133	CP_133	76° 34' 16.3326" E	9° 34' 40.4612" N	672434.984	1059138.332	74.567
134	CP_134	76° 32' 18.1556" E	9° 34' 54.0252" N	668829.626	1059538.768	18.767
135	CP_135	76° 34' 10.6901" E	9° 35' 27.4594" N	672256.341	1060581.440	16.686
136	CP_136	76° 32' 15.7396" E	9° 35' 54.8991" N	668747.595	1061408.598	4.409
137	CP_137	76° 32' 43.5640" E	9° 36' 19.8571" N	669592.519	1062179.165	4.445
138	CP_138	76° 33' 54.6184" E	9° 36' 42.7384" N	671755.751	1062891.947	2.743
139	CP_139	76° 33' 07.8818" E	9° 37' 08.8568" N	670327.152	1063687.883	7.424
140	CP_140	76° 34' 05.4197" E	9° 37' 34.9068" N	672077.746	1064496.184	5.697
141	CP_141	76° 33' 56.9895" E	9° 38' 10.6440" N	671815.704	1065592.938	6.478
142	CP_142	76° 34' 07.6096" E	9° 38' 40.7796" N	672135.235	1066520.261	6.398
143	CP_143	76° 34' 10.3870" E	9° 39' 17.0217" N	672214.796	1067634.093	6.203
144	CP_144	76° 34' 21.9083" E	9° 39' 49.4332" N	672561.442	1068631.470	14.591
145	CP_145	76° 34' 13.0616" E	9° 40' 28.7689" N	672286.187	1069838.716	23.810
146	CP_146	76° 33' 51.9649" E	9° 41' 09.7865" N	671637.291	1071095.918	46.198
147	CP_147	76° 33' 32.2123" E	9° 41' 45.8934" N	671030.097	1072202.444	85.763
148	CP_148	76° 33' 19.0813" E	9° 42' 20.4804" N	670624.978	1073263.204	56.089
149	CP_149	76° 33' 02.6875" E	9° 42' 53.5486" N	670120.645	1074276.850	39.538
150	CP_150	76° 32' 58.8658" E	9° 43' 26.4171" N	669999.547	1075286.110	23.331
151	CP_151	76° 32' 46.9992" E	9° 43' 55.4641" N	669633.792	1076176.849	29.216
152	CP_152	76° 32' 20.8102" E	9° 44' 53.6200" N	668827.474	1077959.887	40.252
153	CP_153	76° 32' 13.7331" E	9° 45' 22.4462" N	668607.761	1078844.511	29.413
154	CP_154	76° 32' 04.3275" E	9° 45' 57.0173" N	668316.294	1079905.304	20.236
155	CP_155	76° 31' 38.6610" E	9° 46' 30.7186" N	667529.419	1080937.130	23.882
156	CP_156	76° 31' 04.5080" E	9° 46' 55.5716" N	666485.201	1081695.966	8.647
157	CP_157	76° 30' 47.5245" E	9° 47' 26.7477" N	665963.358	1082651.427	12.137
158	CP_158	76° 30' 25.3673" E	9° 47' 58.8524" N	665283.755	1083634.714	29.348

159	CP_159	76° 30' 13.1478" E	9° 48' 33.3926" N	664906.664	1084694.185	20.875
160	CP_160	76° 30' 06.0288" E	9° 49' 07.5267" N	664685.058	1085741.874	8.056
161	CP_161	76° 29' 46.8189" E	9° 49' 35.4755" N	664095.909	1086597.898	3.511
162	CP_162	76° 29' 15.6053" E	9° 50' 10.7749" N	663140.054	1087678.123	1.800
163	CP_163	76° 29' 03.1931" E	9° 50' 39.7902" N	662757.930	1088567.843	1.569
164	CP_164	76° 28' 40.7975" E	9° 51' 14.6390" N	662070.873	1089635.434	4.880
165	CP_165	76° 28' 36.0255" E	9° 51' 41.7385" N	661921.816	1090467.331	4.936
166	CP_166	76° 28' 16.1004" E	9° 52' 18.4007" N	661309.828	1091590.969	15.559
167	CP_167	76° 28' 16.8546" E	9° 52' 51.2596" N	661328.357	1092600.546	73.126
168	CP_168	76° 28' 03.3935" E	9° 53' 21.1426" N	660914.247	1093516.789	6.264
169	CP_169	76° 27' 46.9981" E	9° 53' 46.8846" N	660411.325	1094305.424	10.369
170	CP_170	76° 27' 14.1081" E	9° 54' 09.0422" N	659406.455	1094981.750	5.691
171	CP_171	76° 26' 53.2556" E	9° 54' 37.4195" N	658767.465	1095850.766	16.942
172	CP_172	76° 26' 11.9357" E	9° 54' 50.0368" N	657507.159	1096232.928	22.370
173	CP_173	76° 25' 40.9084" E	9° 54' 58.5592" N	656560.940	1096490.678	52.445
174	CP_174	76° 25' 06.9655" E	9° 55' 09.3130" N	655525.634	1096816.618	30.651
175	CP_175	76° 24' 32.7441" E	9° 55' 12.1962" N	654482.893	1096900.763	39.971
176	CP_176	76° 24' 11.5274" E	9° 55' 42.2001" N	653832.756	1097819.770	4.732
177	CP_177	76° 23' 47.6720" E	9° 56' 03.8546" N	653103.361	1098481.948	3.045
178	CP_178	76° 23' 25.8354" E	9° 56' 23.5012" N	652435.736	1099082.709	5.693
179	CP_179	76° 22' 58.4222" E	9° 56' 42.4857" N	651598.377	1099662.434	3.825
180	CP_180	76° 22' 29.2205" E	9° 57' 03.4080" N	650706.325	1100301.477	3.744
181	CP_181	76° 22' 11.7536" E	9° 57' 39.3484" N	650169.788	1101403.375	4.766
182	CP_182	76° 21' 51.3628" E	9° 58' 02.1057" N	649545.905	1102099.923	4.748
183	CP_183	76° 21' 25.0632" E	9° 58' 31.7123" N	648741.238	1103006.149	2.352
184	CP_184	76° 21' 29.0713" E	9° 59' 05.1667" N	648859.074	1104034.377	1.616
185	CP_185	76° 21' 53.9070" E	9° 59' 34.2147" N	649611.703	1104929.857	3.207
186	CP_186	76° 22' 09.0577" E	10° 00' 05.2283" N	650069.120	1105884.518	3.658
187	CP_187	76° 22' 21.6119" E	10° 00' 33.1253" N	650447.843	1106743.114	4.289
188	CP_188	76° 22' 47.5175" E	10° 00' 56.7904" N	651233.642	1107473.413	19.983
189	CP_189	76° 23' 02.6422" E	10° 01' 35.6361" N	651689.171	1108668.709	17.031
190	CP_190	76° 23' 12.1857" E	10° 02' 14.5563" N	651974.721	1109865.587	3.918
191	CP_191	76° 23' 23.4147" E	10° 02' 45.4122" N	652312.614	1110814.946	8.552
192	CP_192	76° 23' 40.3719" E	10° 03' 38.4046" N	652821.998	1112445.104	17.129
193	CP_193	76° 23' 47.3227" E	10° 04' 06.3804" N	653029.962	1113305.443	15.843
194	CP_194	76° 23' 49.2320" E	10° 04' 45.5623" N	653082.956	1114509.394	21.255
195	CP_195	76° 23' 53.8639" E	10° 05' 19.6267" N	653219.499	1115556.484	21.997
196	CP_196	76° 23' 54.4124" E	10° 05' 56.6399" N	653231.331	1116693.633	28.084
197	CP_197	76° 23' 51.0927" E	10° 06' 31.4004" N	653125.701	1117761.077	10.282
198	CP_198	76° 23' 27.8577" E	10° 06' 58.6272" N	652414.825	1118594.486	7.199
199	CP_199	76° 22' 54.8943" E	10° 07' 28.7618" N	651407.472	1119515.978	7.836
200	CP_200	76° 22' 37.0049" E	10° 08' 09.9777" N	650857.567	1120779.854	7.346
201	CP_201	76° 22' 46.1257" E	10° 08' 43.7445" N	651130.794	1121818.370	4.960
202	CP_202	76° 22' 51.5544" E	10° 09' 18.7034" N	651291.471	1122893.037	8.896
203	CP_203	76° 22' 51.3394" E	10° 09' 54.2392" N	651280.284	1123984.699	12.656
204	CP_204	76° 22' 51.1837" E	10° 10' 28.4964" N	651271.065	1125037.086	14.995
205	CP_205	76° 22' 42.0544" E	10° 11' 02.9312" N	650988.715	1126093.771	12.916
206	CP_206	76° 22' 17.8229" E	10° 11' 26.0597" N	650248.243	1126801.164	4.149
207	CP_207	76° 21' 59.0097" E	10° 11' 56.4694" N	649671.747	1127732.951	9.506
208	CP_208	76° 21' 26.7518" E	10° 12' 11.7920" N	648688.080	1128199.539	14.473
209	CP_209	76° 20' 52.5328" E	10° 12' 37.6837" N	647643.406	1128990.588	14.963
210	CP_210	76° 20' 27.2566" E	10° 13' 02.1288" N	646871.101	1129738.351	14.720
211	CP_211	76° 19' 54.2352" E	10° 13' 17.3587" N	645864.313	1130202.062	5.822

212	CP_212	76° 19' 21.1648" E	10° 13' 38.1358" N	644855.362	1130836.203	9.087
213	CP_213	76° 18' 55.2064" E	10° 13' 55.9624" N	644063.232	1131380.607	7.576
214	CP_214	76° 18' 27.5012" E	10° 14' 22.2303" N	643216.920	1132184.132	8.248
215	CP_215	76° 18' 12.1904" E	10° 14' 45.8630" N	642748.105	1132908.242	8.281
216	CP_216	76° 17' 53.5382" E	10° 15' 47.9461" N	642172.871	1134813.141	8.785
217	CP_217	76° 17' 37.9155" E	10° 16' 22.6822" N	641693.246	1135878.318	14.403
218	CP_218	76° 17' 34.9223" E	10° 16' 53.2186" N	641598.400	1136816.029	25.398
219	CP_219	76° 17' 27.5969" E	10° 17' 28.9218" N	641371.117	1137911.932	14.308
220	CP_220	76° 17' 12.9000" E	10° 17' 56.4354" N	640920.601	1138755.352	17.063
221	CP_221	76° 17' 06.4775" E	10° 18' 27.6705" N	640721.365	1139714.109	29.420
222	CP_222	76° 16' 50.0864" E	10° 18' 56.8873" N	640219.134	1140609.648	22.971
223	CP_223	76° 16' 22.5012" E	10° 19' 20.5580" N	639377.085	1141333.457	14.264
224	CP_224	76° 16' 02.3383" E	10° 19' 44.7847" N	638760.786	1142075.262	5.289
225	CP_225	76° 15' 38.2518" E	10° 20' 08.5315" N	638025.216	1142801.857	11.485
226	CP_226	76° 15' 27.9652" E	10° 20' 47.9130" N	637707.547	1144010.411	9.420
227	CP_227	76° 15' 06.6599" E	10° 21' 36.8389" N	637053.596	1145510.848	4.573
228	CP_228	76° 15' 00.8131" E	10° 22' 11.4102" N	636871.592	1146572.168	4.252
229	CP_229	76° 14' 39.2799" E	10° 22' 57.1725" N	636211.162	1147975.401	3.967
230	CP_230	76° 14' 14.6899" E	10° 23' 17.8842" N	635460.811	1148608.736	5.048
231	CP_231	76° 13' 20.9712" E	10° 24' 05.3697" N	633821.451	1150061.137	5.610
232	CP_232	76° 12' 56.2142" E	10° 24' 35.2220" N	633065.039	1150975.290	3.384
233	CP_233	76° 12' 24.8953" E	10° 25' 08.5510" N	632108.708	1151995.493	3.055
234	CP_234	76° 12' 04.3154" E	10° 25' 47.9228" N	631478.292	1153202.587	5.227
235	CP_235	76° 12' 02.5537" E	10° 26' 22.4522" N	631420.695	1154263.099	5.522
236	CP_236	76° 12' 06.6368" E	10° 26' 54.4625" N	631541.114	1155246.904	16.034
237	CP_237	76° 12' 21.8083" E	10° 27' 29.3845" N	631998.332	1156321.443	7.395
238	CP_238	76° 12' 28.0523" E	10° 27' 57.0136" N	632184.938	1157170.919	3.721
239	CP_239	76° 12' 39.3393" E	10° 28' 28.7247" N	632524.380	1158146.381	4.439
240	CP_240	76° 12' 43.0645" E	10° 29' 03.1514" N	632633.571	1159204.388	3.741
241	CP_241	76° 12' 29.8583" E	10° 29' 33.1842" N	632228.515	1160125.433	14.167
242	CP_242	76° 12' 15.2802" E	10° 30' 02.4829" N	631781.857	1161023.774	11.916
243	CP_243	76° 12' 24.3604" E	10° 30' 35.8088" N	632053.980	1162048.585	9.811
244	CP_244	76° 12' 35.0564" E	10° 31' 08.9420" N	632375.227	1163067.672	14.012
245	CP_245	76° 12' 28.2782" E	10° 31' 41.7357" N	632165.290	1164074.283	5.926
246	CP_246	76° 12' 33.3776" E	10° 32' 15.7749" N	632316.272	1165120.548	8.592
247	CP_247	76° 12' 30.9536" E	10° 32' 48.8139" N	632238.669	1166135.206	4.625
248	CP_248	76° 12' 13.8985" E	10° 33' 21.0835" N	631716.427	1167124.514	3.993
249	CP_249	76° 12' 01.2933" E	10° 33' 50.9254" N	631329.753	1168039.771	10.044
250	CP_250	76° 11' 38.6692" E	10° 34' 13.5005" N	630639.434	1168730.629	10.641
251	CP_251	76° 11' 05.2471" E	10° 34' 42.0245" N	629620.252	1169602.999	7.975
252	CP_252	76° 10' 22.6564" E	10° 35' 04.8238" N	628323.123	1170298.486	8.929
253	CP_253	76° 10' 02.4000" E	10° 35' 36.2619" N	627703.849	1171261.928	18.078
254	CP_254	76° 09' 41.8988" E	10° 35' 59.6480" N	627078.093	1171978.001	16.800
255	CP_255	76° 09' 17.8921" E	10° 36' 22.7442" N	626345.862	1172684.782	17.505
256	CP_256	76° 08' 49.9315" E	10° 36' 35.3251" N	625494.691	1173068.111	20.897
257	CP_257	76° 08' 08.9127" E	10° 37' 03.7073" N	624244.929	1173935.409	24.277
258	CP_258	76° 07' 36.8946" E	10° 37' 21.2204" N	623269.965	1174469.849	25.775
259	CP_259	76° 07' 08.2008" E	10° 37' 34.4309" N	622396.530	1174872.510	8.935
260	CP_260	76° 06' 20.4150" E	10° 38' 18.7281" N	620939.548	1176228.061	12.005
261	CP_261	76° 05' 46.6860" E	10° 38' 44.5914" N	619911.810	1177018.910	7.713
262	CP_262	76° 05' 22.5680" E	10° 39' 18.5856" N	619175.281	1178060.577	8.258
263	CP_263	76° 04' 58.9655" E	10° 39' 47.0681" N	618455.052	1178933.003	6.962
264	CP_264	76° 04' 38.4182" E	10° 40' 10.2653" N	617828.252	1179643.407	6.490

265	CP_265	76° 04' 16.1109" E	10° 40' 38.0450" N	617147.515	1180494.401	9.601
266	CP_266	76° 03' 54.6223" E	10° 41' 03.4466" N	616491.940	1181272.441	5.106
267	CP_267	76° 03' 42.6880" E	10° 41' 41.0574" N	616125.376	1182426.534	19.443
268	CP_268	76° 03' 24.7930" E	10° 42' 11.8471" N	615578.465	1183370.478	12.523
269	CP_269	76° 03' 05.0158" E	10° 42' 43.0154" N	614974.365	1184325.862	21.198
270	CP_270	76° 02' 48.1360" E	10° 43' 17.1206" N	614458.009	1185371.769	10.033
271	CP_271	76° 02' 26.7113" E	10° 43' 57.0911" N	613803.009	1186597.385	4.215
272	CP_272	76° 02' 11.4083" E	10° 44' 24.7679" N	613335.280	1187445.998	4.417
273	CP_273	76° 01' 45.8863" E	10° 44' 55.6405" N	612556.838	1188391.740	4.120
274	CP_274	76° 01' 31.5024" E	10° 45' 21.5824" N	612117.258	1189187.168	12.717
275	CP_275	76° 01' 09.7769" E	10° 46' 29.5731" N	611450.410	1191273.514	6.446
276	CP_276	76° 01' 02.0071" E	10° 47' 05.7869" N	611210.726	1192385.149	7.645
277	CP_277	76° 00' 27.9679" E	10° 48' 20.6286" N	610169.322	1194680.722	18.398
278	CP_278	76° 00' 08.9094" E	10° 49' 09.8549" N	609585.559	1196190.954	3.077
279	CP_279	75° 59' 57.0399" E	10° 49' 41.0700" N	609221.963	1197148.639	6.210
280	CP_280	75° 59' 45.4611" E	10° 50' 14.6502" N	608866.977	1198179.006	17.674
281	CP_281	75° 59' 31.1178" E	10° 50' 44.1506" N	608428.473	1199083.777	8.400
282	CP_282	75° 59' 25.7359" E	10° 51' 15.1801" N	608261.945	1200036.410	8.564
283	CP_283	75° 59' 02.7292" E	10° 51' 57.1061" N	607559.192	1201322.027	10.567
284	CP_284	75° 58' 39.7803" E	10° 52' 22.2852" N	606859.896	1202093.226	13.308
285	CP_285	75° 58' 12.4647" E	10° 52' 44.0412" N	606028.390	1202758.865	7.957
286	CP_286	75° 57' 33.4281" E	10° 53' 03.2943" N	604841.298	1203346.513	14.024
287	CP_287	75° 56' 55.6434" E	10° 53' 31.5361" N	603691.394	1204210.430	5.849
288	CP_288	75° 56' 27.5287" E	10° 53' 47.9886" N	602836.252	1204713.152	4.713
289	CP_289	75° 55' 53.1749" E	10° 54' 13.7436" N	601790.844	1205501.061	4.414
290	CP_290	75° 55' 29.1350" E	10° 54' 39.3560" N	601058.613	1206285.576	5.987
291	CP_291	75° 55' 16.7652" E	10° 55' 08.1659" N	600680.393	1207169.401	7.301
292	CP_292	75° 54' 52.0324" E	10° 55' 36.4297" N	599926.944	1208035.316	7.918
293	CP_293	75° 54' 39.7265" E	10° 56' 03.0751" N	599550.912	1208852.667	9.581
294	CP_294	75° 54' 20.6730" E	10° 56' 34.8856" N	598969.595	1209828.065	11.543
295	CP_295	75° 54' 01.6322" E	10° 57' 00.6101" N	598389.256	1210616.528	9.754
296	CP_296	75° 53' 46.8889" E	10° 57' 26.5882" N	597939.364	1211413.177	10.480
297	CP_297	75° 53' 29.8963" E	10° 57' 49.3231" N	597421.518	1212110.004	8.183
298	CP_298	75° 53' 08.9789" E	10° 58' 19.2153" N	596783.919	1213026.341	8.020
299	CP_299	75° 52' 46.2080" E	10° 58' 49.7152" N	596090.044	1213961.189	5.989
300	CP_300	75° 52' 34.2815" E	10° 59' 28.1851" N	595724.620	1215141.827	4.639
301	CP_301	75° 52' 24.5679" E	11° 00' 06.3894" N	595426.401	1216314.503	5.291
302	CP_302	75° 52' 21.5480" E	11° 00' 41.9179" N	595331.577	1217405.577	10.181
303	CP_303	75° 52' 09.4206" E	11° 01' 17.0019" N	594960.417	1218482.197	8.269
304	CP_304	75° 52' 02.6161" E	11° 01' 47.8036" N	594751.184	1219427.746	9.106
305	CP_305	75° 51' 51.6258" E	11° 02' 15.9860" N	594415.175	1220292.468	8.938
306	CP_306	75° 51' 36.6373" E	11° 02' 45.0594" N	593957.785	1221184.215	9.278
307	CP_307	75° 51' 21.3049" E	11° 03' 16.5462" N	593489.768	1222150.072	8.272
308	CP_308	75° 51' 21.6582" E	11° 03' 48.9080" N	593497.639	1223144.170	9.773
309	CP_309	75° 51' 19.0112" E	11° 04' 20.2523" N	593414.564	1224106.754	9.331
310	CP_310	75° 51' 17.3384" E	11° 04' 53.3561" N	593360.894	1225123.469	8.421
311	CP_311	75° 51' 04.0358" E	11° 05' 28.8644" N	592954.174	1226213.036	6.664
312	CP_312	75° 50' 46.1613" E	11° 06' 04.3187" N	592408.779	1227300.552	4.123
313	CP_313	75° 50' 31.1318" E	11° 06' 33.2147" N	591950.300	1228186.865	6.290
314	CP_314	75° 50' 18.6121" E	11° 07' 02.2891" N	591567.966	1229078.881	5.080
315	CP_315	75° 49' 59.2075" E	11° 07' 31.8553" N	590976.753	1229985.417	5.510
316	CP_316	75° 49' 44.4185" E	11° 07' 58.5740" N	590525.826	1230804.887	5.734
317	CP_317	75° 49' 36.9726" E	11° 08' 26.1322" N	590297.596	1231650.770	3.438

318	CP_318	75° 49' 39.6352" E	11° 08' 59.6161" N	590375.491	1232679.532	1.946
319	CP_319	75° 49' 46.6066" E	11° 09' 31.0887" N	590584.246	1233646.876	6.219
320	CP_320	75° 49' 50.5236" E	11° 10' 04.5105" N	590700.177	1234673.839	6.320
321	CP_321	75° 49' 47.5175" E	11° 10' 36.9960" N	590606.198	1235671.452	8.269
322	CP_322	75° 49' 34.4134" E	11° 11' 02.5993" N	590206.547	1236456.803	5.325
323	CP_323	75° 49' 10.4118" E	11° 11' 28.9296" N	589476.347	1237263.573	1.776
324	CP_324	75° 48' 47.3416" E	11° 11' 52.2287" N	588774.688	1237977.324	1.852
325	CP_325	75° 48' 14.5942" E	11° 12' 15.2965" N	587779.596	1238683.180	5.003
326	CP_326	75° 47' 51.0342" E	11° 12' 45.3472" N	587062.591	1239604.314	14.434
327	CP_327	75° 47' 36.4907" E	11° 13' 12.4529" N	586619.297	1240435.735	8.998
328	CP_328	75° 47' 26.8840" E	11° 13' 43.9510" N	586325.371	1241402.484	10.334
329	CP_329	75° 47' 08.5951" E	11° 14' 16.0371" N	585768.134	1242386.593	2.067
330	CP_330	75° 46' 46.9678" E	11° 14' 41.7894" N	585110.218	1243175.885	3.860
331	CP_331	75° 46' 45.8896" E	11° 15' 15.9872" N	585074.737	1244226.256	8.936
332	CP_332	75° 46' 29.5835" E	11° 15' 45.1989" N	584577.936	1245122.247	7.279
333	CP_333	75° 46' 17.0216" E	11° 16' 17.1696" N	584194.467	1246103.293	6.003
334	CP_334	75° 46' 02.4633" E	11° 16' 49.2449" N	583750.480	1247087.395	6.164
335	CP_335	75° 45' 49.8646" E	11° 17' 22.6533" N	583365.821	1248112.607	5.539
336	CP_336	75° 45' 35.2310" E	11° 17' 53.5689" N	582919.695	1249061.092	5.992
337	CP_337	75° 45' 19.5842" E	11° 18' 22.8604" N	582443.002	1249959.613	9.896
338	CP_338	75° 45' 07.2616" E	11° 19' 10.4732" N	582065.662	1251421.176	8.440
339	CP_339	75° 44' 26.8785" E	11° 20' 12.5474" N	580836.618	1253324.784	4.511
340	CP_340	75° 44' 27.9647" E	11° 20' 43.5295" N	580867.121	1254276.548	5.228
341	CP_341	75° 44' 23.6133" E	11° 21' 51.8277" N	580729.889	1256374.138	7.316
342	CP_342	75° 44' 01.2755" E	11° 22' 49.5308" N	580048.355	1258144.894	5.995
343	CP_343	75° 43' 52.5496" E	11° 23' 03.9579" N	579782.772	1258587.386	4.398
344	CP_344	75° 43' 35.1036" E	11° 23' 41.6298" N	579251.124	1259743.232	9.418
345	CP_345	75° 43' 17.9989" E	11° 24' 08.2144" N	578730.705	1260558.540	3.626
346	CP_346	75° 42' 51.6166" E	11° 24' 52.9051" N	577927.782	1261929.326	5.625
347	CP_347	75° 42' 29.8849" E	11° 25' 28.5176" N	577266.536	1263021.617	7.661
348	CP_348	75° 42' 03.7063" E	11° 26' 09.6627" N	576470.174	1264283.541	9.382
349	CP_349	75° 41' 37.3178" E	11° 26' 46.2154" N	575667.849	1265404.400	10.201
350	CP_350	75° 41' 06.2414" E	11° 27' 13.3428" N	574724.226	1266235.425	8.313
351	CP_351	75° 40' 44.8521" E	11° 27' 35.5367" N	574074.522	1266915.620	8.026
352	CP_352	75° 40' 04.7330" E	11° 27' 56.2518" N	572857.461	1267549.086	5.768
353	CP_353	75° 39' 45.9540" E	11° 28' 12.5166" N	572287.331	1268047.377	4.751
354	CP_354	75° 39' 14.5840" E	11° 28' 43.9759" N	571334.680	1269011.535	1.693
355	CP_355	75° 38' 33.4705" E	11° 29' 50.3778" N	570084.495	1271048.385	1.813
356	CP_356	75° 38' 06.2003" E	11° 30' 45.6295" N	569254.585	1272743.703	5.590
357	CP_357	75° 37' 52.7781" E	11° 31' 16.8287" N	568845.870	1273701.147	10.808
358	CP_358	75° 37' 37.5844" E	11° 31' 43.5257" N	568383.819	1274520.185	5.442
359	CP_359	75° 37' 16.0963" E	11° 32' 19.1767" N	567730.533	1275613.853	13.478
360	CP_360	75° 36' 59.9794" E	11° 32' 50.1420" N	567240.292	1276563.950	10.495
361	CP_361	75° 36' 59.0846" E	11° 33' 32.4174" N	567210.391	1277862.457	12.173
362	CP_362	75° 37' 01.6599" E	11° 34' 06.3330" N	567286.145	1278904.406	1.670
363	CP_363	75° 37' 09.5739" E	11° 34' 37.0835" N	567523.791	1279849.483	8.323
364	CP_364	75° 37' 18.8061" E	11° 35' 09.9075" N	567801.205	1280858.342	15.944
365	CP_365	75° 37' 08.7283" E	11° 35' 42.2745" N	567493.834	1281851.892	17.599
366	CP_366	75° 36' 53.1619" E	11° 36' 11.8331" N	567020.454	1282758.822	6.792
367	CP_367	75° 36' 27.6270" E	11° 36' 32.7581" N	566245.788	1283399.911	5.550
368	CP_368	75° 35' 59.6132" E	11° 36' 52.0781" N	565396.194	1283991.564	5.391
369	CP_369	75° 35' 38.3870" E	11° 37' 20.5660" N	564751.588	1284865.272	25.965
370	CP_370	75° 35' 09.2149" E	11° 37' 41.9669" N	563866.854	1285520.807	4.865

371	CP_371	75° 34' 52.1627" E	11° 38' 07.7962" N	563348.878	1286313.139	14.644
372	CP_372	75° 34' 36.7849" E	11° 38' 39.5024" N	562881.259	1287286.103	21.656
373	CP_373	75° 34' 13.7384" E	11° 39' 11.0807" N	562181.481	1288254.678	6.015
374	CP_374	75° 33' 55.9067" E	11° 39' 46.8486" N	561639.378	1289352.269	4.791
375	CP_375	75° 33' 28.6193" E	11° 40' 10.4813" N	560811.768	1290076.551	7.748
376	CP_376	75° 33' 12.0469" E	11° 40' 42.2281" N	560308.112	1291050.726	7.413
377	CP_377	75° 33' 01.3643" E	11° 41' 12.5190" N	559982.883	1291980.533	15.307
378	CP_378	75° 32' 47.8285" E	11° 41' 44.1946" N	559571.213	1292952.711	6.206
379	CP_379	75° 32' 41.4094" E	11° 42' 22.6858" N	559374.606	1294134.661	2.851
380	CP_380	75° 32' 41.0103" E	11° 42' 59.1098" N	559360.363	1295253.464	6.856
381	CP_381	75° 32' 37.9623" E	11° 43' 33.6329" N	559266.054	1296313.724	4.855
382	CP_382	75° 32' 38.9307" E	11° 44' 09.3200" N	559293.250	1297409.975	28.014
383	CP_383	75° 32' 45.3205" E	11° 44' 39.2963" N	559484.876	1298331.129	21.807
384	CP_384	75° 32' 38.9901" E	11° 45' 12.0371" N	559291.322	1299336.450	3.989
385	CP_385	75° 32' 31.6421" E	11° 45' 43.0865" N	559067.083	1300289.761	9.934
386	CP_386	75° 32' 12.9517" E	11° 46' 17.7636" N	558499.361	1301353.848	8.487
387	CP_387	75° 31' 54.9840" E	11° 46' 50.6690" N	557953.650	1302363.564	20.180
388	CP_388	75° 31' 39.8228" E	11° 47' 22.9149" N	557492.947	1303353.190	9.803
389	CP_389	75° 31' 18.4909" E	11° 47' 57.8795" N	556845.380	1304425.984	10.260
390	CP_390	75° 30' 47.1011" E	11° 48' 20.3183" N	555894.200	1305113.480	26.639
391	CP_391	75° 30' 18.1202" E	11° 48' 49.8221" N	555015.570	1306018.146	30.393
392	CP_392	75° 29' 59.8794" E	11° 49' 13.4801" N	554462.297	1306743.855	16.363
393	CP_393	75° 29' 22.1456" E	11° 49' 22.3727" N	553320.013	1307014.987	2.451
394	CP_394	75° 28' 46.9081" E	11° 49' 26.5956" N	552253.529	1307142.853	16.883
395	CP_395	75° 28' 12.8824" E	11° 49' 40.9429" N	551223.204	1307581.804	15.714
396	CP_396	75° 27' 32.8642" E	11° 49' 43.2053" N	550012.196	1307649.285	8.313
397	CP_397	75° 27' 00.4131" E	11° 49' 58.3638" N	549029.524	1308113.305	14.499
398	CP_398	75° 26' 30.3080" E	11° 50' 20.0104" N	548117.552	1308776.764	5.696
399	CP_399	75° 25' 58.1827" E	11° 50' 36.3173" N	547144.752	1309276.133	20.979
400	CP_400	75° 25' 33.2503" E	11° 50' 58.8327" N	546389.323	1309966.570	16.555
401	CP_401	75° 25' 07.1960" E	11° 51' 21.5053" N	545599.978	1310661.799	13.176
402	CP_402	75° 24' 42.9606" E	11° 51' 44.2947" N	544865.692	1311360.718	5.598
403	CP_403	75° 23' 04.1844" E	11° 51' 59.8680" N	541876.602	1311834.807	7.071
404	CP_404	75° 24' 12.5818" E	11° 52' 00.4253" N	543945.879	1311854.851	4.415
405	CP_405	75° 22' 29.9631" E	11° 52' 00.7856" N	540841.233	1311861.580	3.576
406	CP_406	75° 23' 39.2495" E	11° 52' 06.2843" N	542937.184	1312033.376	5.969
407	CP_407	75° 22' 03.2841" E	11° 52' 28.4464" N	540032.965	1312710.147	16.740
408	CP_408	75° 21' 53.0261" E	11° 52' 49.6432" N	539721.775	1313360.828	3.708
409	CP_409	75° 21' 34.7845" E	11° 53' 22.8328" N	539168.604	1314379.575	14.571
410	CP_410	75° 21' 34.3262" E	11° 53' 54.8771" N	539153.466	1315363.844	9.385
411	CP_411	75° 21' 14.1500" E	11° 54' 23.7032" N	538542.000	1316248.498	23.951
412	CP_412	75° 21' 04.8658" E	11° 54' 55.3521" N	538259.927	1317220.282	25.782
413	CP_413	75° 20' 49.4120" E	11° 55' 24.2218" N	537791.361	1318106.470	19.403
414	CP_414	75° 20' 54.0054" E	11° 56' 20.2848" N	537928.137	1319828.702	3.566
415	CP_415	75° 20' 47.7187" E	11° 56' 47.1540" N	537736.956	1320653.792	4.899
416	CP_416	75° 20' 24.6004" E	11° 57' 10.6937" N	537036.853	1321375.982	4.193
417	CP_417	75° 20' 01.8399" E	11° 57' 37.3421" N	536347.489	1322193.688	4.138
418	CP_418	75° 19' 37.5111" E	11° 58' 02.9499" N	535610.770	1322979.392	4.804
419	CP_419	75° 19' 17.9720" E	11° 58' 29.3477" N	535018.910	1323789.545	3.447
420	CP_420	75° 18' 54.7405" E	11° 58' 54.0166" N	534315.480	1324546.478	4.762
421	CP_421	75° 18' 32.8138" E	11° 59' 20.6317" N	533651.479	1325363.250	4.245
422	CP_422	75° 18' 11.6917" E	11° 59' 38.2723" N	533012.144	1325904.399	3.612
423	CP_423	75° 17' 40.8752" E	11° 59' 53.4021" N	532079.766	1326368.123	2.636

424	CP_424	75° 17' 10.0686" E	12° 00' 09.9102" N	531147.672	1326874.214	2.394
425	CP_425	75° 16' 50.4603" E	12° 00' 34.9196" N	530553.962	1327641.803	2.246
426	CP_426	75° 16' 29.0724" E	12° 00' 59.5890" N	529906.481	1328398.908	1.696
427	CP_427	75° 16' 07.0483" E	12° 01' 33.8697" N	529239.506	1329451.232	1.596
428	CP_428	75° 15' 45.1552" E	12° 01' 55.4999" N	528576.913	1330114.997	40.437
429	CP_429	75° 15' 20.8049" E	12° 02' 19.5545" N	527839.984	1330853.175	34.379
430	CP_430	75° 14' 48.1041" E	12° 03' 00.9772" N	526850.145	1332124.630	2.104
431	CP_431	75° 14' 35.8717" E	12° 03' 29.3925" N	526479.547	1332997.120	1.561
432	CP_432	75° 14' 08.8580" E	12° 03' 51.7024" N	525662.268	1333681.687	4.659
433	CP_433	75° 13' 44.3151" E	12° 04' 13.0467" N	524919.749	1334336.680	2.698
434	CP_434	75° 12' 46.5657" E	12° 04' 40.0290" N	523173.282	1335164.076	2.276
435	CP_435	75° 12' 17.2919" E	12° 04' 53.8284" N	522288.016	1335587.269	2.175
436	CP_436	75° 11' 55.5150" E	12° 05' 17.5555" N	521629.177	1336315.595	2.590
437	CP_437	75° 11' 36.6068" E	12° 05' 46.6013" N	521056.970	1337207.373	2.563
438	CP_438	75° 11' 20.0573" E	12° 06' 21.9987" N	520555.962	1338294.306	1.795
439	CP_439	75° 11' 09.6452" E	12° 06' 54.4377" N	520240.556	1339290.504	2.144
440	CP_440	75° 10' 55.5365" E	12° 07' 24.8036" N	519813.488	1340222.951	5.758
441	CP_441	75° 10' 40.0743" E	12° 07' 56.9898" N	519345.499	1341211.291	5.770
442	CP_442	75° 10' 36.0779" E	12° 08' 29.7743" N	519224.058	1342218.239	6.157
443	CP_443	75° 10' 30.0936" E	12° 09' 03.5693" N	519042.529	1343256.190	6.208
444	CP_444	75° 10' 25.3059" E	12° 09' 33.7085" N	518897.245	1344181.871	6.646
445	CP_445	75° 10' 21.7571" E	12° 10' 04.5670" N	518789.395	1345129.670	6.661
446	CP_446	75° 10' 15.2329" E	12° 10' 32.6153" N	518591.692	1345991.095	3.754
447	CP_447	75° 09' 59.4794" E	12° 10' 55.4312" N	518115.208	1346691.626	3.161
448	CP_448	75° 09' 37.9125" E	12° 11' 23.6316" N	517462.978	1347557.455	3.059
449	CP_449	75° 09' 29.7453" E	12° 11' 54.2612" N	517215.638	1348498.149	16.739
450	CP_450	75° 09' 19.2199" E	12° 12' 40.2806" N	516896.789	1349911.531	3.790
451	CP_451	75° 09' 11.1436" E	12° 13' 01.0637" N	516652.401	1350549.778	3.280
452	CP_452	75° 08' 52.7067" E	12° 14' 09.7049" N	516094.190	1352657.901	7.914
453	CP_453	75° 08' 40.6536" E	12° 14' 34.9363" N	515729.626	1353432.730	6.364
454	CP_454	75° 08' 21.5227" E	12° 15' 02.4431" N	515151.218	1354277.348	11.125
455	CP_455	75° 08' 01.4441" E	12° 15' 28.5641" N	514544.237	1355079.392	9.569
456	CP_456	75° 07' 37.2093" E	12° 15' 49.2819" N	513811.814	1355715.424	4.780
457	CP_457	75° 06' 38.6761" E	12° 16' 18.4012" N	512043.216	1356609.095	6.436
458	CP_458	75° 06' 23.5389" E	12° 16' 45.0516" N	511585.629	1357427.524	5.735
459	CP_459	75° 06' 10.0119" E	12° 17' 15.6335" N	511176.655	1358366.745	6.439
460	CP_460	75° 05' 54.7332" E	12° 17' 37.5220" N	510714.899	1359038.916	5.954
461	CP_461	75° 05' 20.1227" E	12° 18' 40.2002" N	509668.832	1360963.828	5.493
462	CP_462	75° 05' 05.5961" E	12° 19' 10.3259" N	509229.787	1361889.052	6.834
463	CP_463	75° 04' 53.4428" E	12° 19' 40.2317" N	508862.447	1362807.550	6.030
464	CP_464	75° 04' 40.1246" E	12° 20' 09.8736" N	508459.950	1363717.937	5.800
465	CP_465	75° 04' 29.4068" E	12° 20' 41.1743" N	508135.998	1364679.306	7.271
466	CP_466	75° 03' 33.1203" E	12° 22' 03.5394" N	506435.602	1367208.884	5.920
467	CP_467	75° 03' 14.1550" E	12° 22' 23.4691" N	505862.782	1367820.942	8.635
468	CP_468	75° 02' 38.3601" E	12° 23' 15.5093" N	504781.644	1369419.264	9.516
469	CP_469	75° 02' 14.1813" E	12° 23' 48.0388" N	504051.429	1370418.361	8.073
470	CP_470	75° 01' 43.3213" E	12° 24' 43.8675" N	503119.469	1372133.136	8.045
471	CP_471	75° 01' 43.7452" E	12° 25' 13.1543" N	503132.170	1373032.742	10.367
472	CP_472	75° 01' 39.4185" E	12° 25' 45.2846" N	503001.438	1374019.678	7.715
473	CP_473	75° 01' 26.9866" E	12° 26' 12.2660" N	502626.046	1374848.430	20.287
474	CP_474	75° 00' 33.6984" E	12° 26' 57.3538" N	501017.274	1376233.295	27.894
475	CP_475	75° 00' 07.1688" E	12° 27' 16.6537" N	500216.405	1376826.118	13.419
476	CP_476	74° 59' 52.1789" E	12° 27' 50.2366" N	499763.914	1377857.687	7.163

477	CP_477	74° 59' 36.7045" E	12° 28' 50.6109" N	499296.848	1379712.223	17.333
478	CP_478	74° 59' 18.9978" E	12° 29' 19.3968" N	498762.429	1380596.464	12.900
479	CP_479	74° 59' 08.4962" E	12° 29' 45.4199" N	498445.501	1381395.837	10.719
480	CP_480	74° 58' 37.2114" E	12° 30' 11.0132" N	497501.325	1382182.058	7.077

LIST OF DETAILS - HIGH FLOOD LEVEL (HFL)

SL.NO	TYPE OF CROSSING	HFL Co-ordinates derived from Aerial LiDAR Data			HFL measured from Ground reference(metres)	Final HFL (in MSL) (metres)	HFL Co-ordinates collected by Ground Team		REMARKS
		Easting (metres)	Northing (metres)	MSL Ground Reference(metres)			LATITUDE	LONGITUDE	
1	RIVER CROSSING	499602.698	1379079.711	7.832	0.500	8.332	12.475011	74.996364	0.5M RIVER SIDE GROUND TO UP
2	RIVER CROSSING	499622.225	1379096.593	8.065	0.500	8.565	12.475191	74.99657	0.5M RIVER SIDE GROUND TO UP
3	RIVER CROSSING	506378.002	1367109.204	6.668	1.000	7.668	12.366749	75.058669	1.0M RIVER SIDE GROUND TO UP
4	RIVER CROSSING	506369.658	1367099.485	5.306	0.700	6.006	12.366664	75.058598	0.7M RIVER SIDE GROUND TO UP
5	RIVER CROSSING	506453.809	1367151.925	5.609	0.500	6.109	12.367141	75.059382	0.5M RIVER SIDE GROUND TO UP
6	RIVER CROSSING	506467.012	1367157.975	5.033	0.500	5.533	12.367189	75.059489	0.5M RIVER SIDE GROUND TO UP
7	RIVER CROSSING	513178.144	1355986.647	6.473	0.500	6.973	12.266178	75.121179	0.5M RIVER SIDE GROUND TO UP
8	RIVER CROSSING	513170.286	1356000.303	7.119	0.500	7.619	12.266288	75.121134	0.5M RIVER SIDE GROUND TO UP
9	RIVER CROSSING	516357.401	1351731.477	5.977	0.700	6.677	12.227652	75.150394	0.7M RIVER SIDE GROUND TO UP
10	RIVER CROSSING	516349.016	1351726.561	5.780	0.700	6.480	12.227604	75.150299	0.7M RIVER SIDE GROUND TO UP
11	RIVER CROSSING	516070.770	1352757.191	7.787	0.500	8.287	12.236921	75.147738	0.5M RIVER SIDE GROUND TO UP
12	RIVER CROSSING	515936.102	1353173.457	6.977	0.500	7.477	12.240696	75.146537	0.5M RIVER SIDE GROUND TO UP
13	RIVER CROSSING	709845.852	940856.567	3.005	0.500	3.505	8.506956	76.906321	0.5M ROAD TO UP
14	CANAL CROSSING	700642.157	953412.357	4.943	2.000	6.943	8.61933	76.825431	2.0M GROUND TO UP
15	CANAL CROSSING	700986.354	953250.523	3.506	0.500	4.006	8.619395	76.82631	0.5M GROUND TO UP
16	ROAD CROSSING T	698896.311	966843.706	19.613	0.500	20.113	8.742341	76.808015	0.5M GROUND TO UP
17	ROAD CROSSING	698887.796	966870.273	19.869	0.500	20.369	8.742577	76.807933	0.5M GROUND TO UP
18	CANAL CROSSING	688949.329	978652.028	31.673	0.500	32.173	8.849516	76.718101	0.5M GROUND TO UP
19	CANAL CROSSING	684492.532	981074.239	8.101	0.500	8.601	8.87161	76.677706	0.5M GROUND TO UP
20	STREAM	683201.744	982025.937	5.579	0.500	6.079	8.880289	76.665999	0.5M GROUND TO UP
21	STREAM	683221.576	982046.812	5.711	0.500	6.211	8.880454	76.666182	0.5M GROUND TO UP
22	ROAD CROSSING	682884.032	982224.007	5.731	0.500	6.231	8.882391	76.663277	0.5M GROUND TO UP
23	ROAD CROSSING	682936.392	982291.383	5.909	0.500	6.409	8.882642	76.663542	0.5M GROUND TO UP
24	STREAM	683714.898	984569.871	15.242	0.500	15.742	8.903244	76.670775	0.5M GROUND TO UP
25	STREAM	680554.216	1033474.417	4.997	0.500	5.497	9.345536	76.644065	0.5M GROUND TO UP
26	STREAM	671551.865	1053205.440	4.900	0.500	5.400	9.524299	76.562916	0.5M CULVERT TO UP
27	STREAM	671459.696	1053239.393	2.965	0.500	3.465	9.524539	76.562306	0.5M CULVERT TO UP
28	STREAM	671437.752	1053245.044	2.984	0.500	3.484	9.524619	76.561858	0.5M CULVERT TO UP
29	STREAM	670217.467	1055048.634	2.765	0.500	3.265	9.54102	76.550836	0.5M ROAD TO UP
30	RIVER CROSSING	668736.530	1061251.468	6.475	1.000	7.475	9.597167	76.53756	1.0M GROUND TO UP
31	RIVER CROSSING	671871.077	1065003.198	10.615	-1.500	9.115	9.630957	76.56631	1.5M BRIDGE TOP TO DOWN
32	STREAM	672385.250	1068203.303	4.463	0.800	5.263	9.659884	76.571111	0.8M GROUND TO UP
33	RIVER CROSSING	652442.574	1099055.734	6.483	1.000	7.483	9.939618	76.390562	1.0M CONCRATE WALL TO UP
34	STREAM	650888.996	1099882.690	4.712	0.500	5.212	9.947152	76.376431	0.5M CONCRATE WALL TO UP
35	RIVER CROSSING	650131.869	1101391.390	5.367	1.000	6.367	9.960839	76.369571	1.0M GROUND TO UP
36	STREAM	649980.028	1106359.674	4.397	1.500	5.897	10.005893	76.368432	1.5M GROUND TO UP
37	STREAM	652497.102	1111338.314	2.312	0.500	2.812	10.050669	76.391535	0.5M GROUND TO UP
38	STREAM	651055.327	1121704.739	9.873	-0.800	9.073	10.14446	76.378787	0.8M BRIDGE BELLOW LEVEL
39	STREAM	651077.906	1121698.024	7.238	2.000	9.238	10.144399	76.378992	2.0M GROUND TO UP
40	STREAM	632091.623	1151928.377	4.386	0.500	4.886	10.418536	76.206827	0.5M BRIDGE TO UP
41	STREAM	631948.850	1161588.891	4.916	3.000	7.916	10.505795	76.205784	3.0M CULVERT TO UP
42	CULVERT	632262.349	1163042.609	4.921	0.500	5.421	10.519167	76.208705	0.5M GROUND TO UP
43	RIVER CROSSING	632158.938	1166299.734	7.379	-1.000	6.379	10.548382	76.207868	1.0M CULVERT TO DOWN
44	STREAM	632206.866	1165974.661	7.138	-1.000	6.138	10.545443	76.2083	1.0M CULVERT TO DOWN
45	STREAM	632235.303	1165560.811	7.233	-1.000	6.233	10.541699	76.208548	1.0M CULVERT TO DOWN
46	STREAM	632256.032	1165561.861	6.888	-1.000	5.888	10.541707	76.208736	1.0M CULVERT TO DOWN
47	CANAL CROSSING	566650.976	1282985.394	6.578	-0.500	6.078	11.605369	75.611374	0.5M CULVERT TO DOWN
48	CANAL CROSSING	566061.483	1283497.286	6.017	-0.500	5.517	11.609984	75.605986	0.5M CULVERT TO DOWN
49	STREAM	563980.180	1285471.147	5.673	0.500	6.173	11.627915	75.586918	0.5M GROUND TO UP
50	CANAL CROSSING	563870.283	1285921.579	3.847	0.500	4.347	11.631946	75.585933	0.5M GROUND TO UP
51	PARVATHY PUTHANAR RIVER	706843.608	943778.167	6.002	0.800	6.802	8.533463	76.879185	0.8M GROUND TO UP
52	WATERBODY AREA	702767.261	951569.501	2.502	3.000	5.502	8.604118	76.841018	3.0M GROUND TO UP
53	WATERBODY AREA	700591.637	953694.801	2.202	1.500	3.702	8.623462	76.822861	1.5M GROUND TO UP
54	WATERBODY AREA	700555.673	953697.750	2.507	1.000	3.507	8.623397	76.82253	1.0M GROUND TO UP
55	WATERBODY AREA	698911.792	956932.099	2.083	1.500	3.583	8.652752	76.807716	1.5M GROUND TO UP
56	WATERBODY AREA	698948.825	956953.358	1.935	1.500	3.435	8.652924	76.808064	1.5M GROUND TO UP
57	WATERBODY AREA	699030.042	956952.570	1.890	1.500	3.390	8.652511	76.808699	1.5M GROUND TO UP
58	WATERBODY AREA	698849.231	966833.036	19.258	1.000	20.258	8.742259	76.807582	1.0M GROUND TO UP
59	WATERBODY AREA	698887.977	966854.009	19.525	1.000	20.525	8.742423	76.807796	1.0M GROUND TO UP
60	WATERBODY AREA	698895.893	966813.019	18.719	1.500	20.219	8.742065	76.808009	1.5M GROUND TO UP
61	WATERBODY AREA	698892.937	966839.567	19.414	2.000	21.414	8.743698	76.807313	2.0M GROUND TO UP
62	WATERBODY AREA	697997.055	962573.731	4.119	1.500	5.619	8.703778	76.79966	1.5M GROUND TO UP
63	WATERBODY AREA	697941.949	962578.220	4.980	0.500	5.480	8.7037877	76.799109	0.5M GROUND TO UP
64	WATERBODY AREA	697899.148	962488.007	5.630	0.500	6.130	8.703092	76.798883	0.5M GROUND TO UP
65	WATERBODY AREA	697899.525	961094.767	4.024	0.500	4.524	8.690402	76.798698	0.5M GROUND TO UP
66	RIVER CROSSING	698162.050	958781.907	6.916	0.500	7.416	8.66932	76.800931	0.5M GROUND TO UP
67	RIVER CROSSING	698118.971	958717.106	6.189	0.800	6.989	8.668885	76.800628	0.8M GROUND TO UP
68	WATERBODY AREA	693836.478	977206.774	18.546	1.500	20.046	8.836196	76.762643	1.5M GROUND TO UP
69	WATERBODY AREA	693971.068	977330.375	20.220	0.500	20.720	8.837436	76.763392	0.5M GROUND TO UP
70	WATERBODY AREA	691841.736	977840.740	27.168	1.500	28.668	8.842055	76.744439	1.5M GROUND TO UP
71	WATERBODY AREA	691987.148	977904.612	25.203	1.000	26.203	8.842572	76.745798	1.0M GROUND TO UP
72	CANAL CROSSING	688958.379	978683.160	29.875	0.300	30.175	8.849752	76.718174	0.3M GROUND TO UP
73	RIVER CROSSING	687004.952	979441.983	2.854	0.800	3.654	8.856681	76.70037	0.8M GROUND TO UP
74	WATERBODY AREA	687033.219	979422.950	3.546	0.500	4.046	8.856591	76.700751	0.5M GROUND TO UP
75	WATERBODY AREA	685548.559	980115.605	2.287	1.500	3.787	8.863021	76.687001	1.5M GROUND TO UP
76	WATERBODY AREA	685548.383	980254.859	4.198	0.500	4.698	8.864156	76.687264	0.5M GROUND TO UP
77	WATERBODY AREA	684470.882	981099.916	7.036	1.000	8.036	8.871855	76.677522	1.0M GROUND TO UP
78	WATERBODY AREA	684494.787	981073.463	7.978	1.000	8.978	8.87146	76.677995	1.0M GROUND TO UP
79	WATERBODY AREA	683195.846	982008.498	5.719	1.500	7.219	8.880157	76.666258	1.5M GROUND TO UP
80	WATERBODY AREA	683157.573	982030.488	5.831	1.500	7.331	8.880462	76.66578	1.5M GROUND TO UP
81	WATERBODY AREA	683207.230	982031.000	5.636	0.800	6.436	8.88033	76.666025	0.8M GROUND TO UP
82	WATERBODY AREA	682895.539	982244.057	5.924	2.500	8.424	8.882569	76.663085	2.5M GROUND TO UP
83	WATERBODY AREA	682911.421	982266.701	6.063	2.500	8.563	8.882318	76.663452	2.5M GROUND TO UP
84	WATERBODY AREA	682548.924	982776.372	5.319	1.500	6.819	8.886899	76.660213	1.5M GROUND TO UP
85	WATERBODY AREA	681962.107	984110.507	5.481	1.500	6.981	8.899434	76.654694	1.5M GROUND TO UP
86	WATERBODY AREA	682033.426	984562.067	5.354	0.500	5.854	8.903274	76.655459	0.5M GROUND TO UP
87	WATERBODY AREA	682292.604	986416.851	8.344	1.000	9.344	8.922606	76.660048	1.0M GROUND TO UP
88	WATERBODY AREA	683693.487	989208.920	15.357	0.800	16.157	8.945191	76.670775	0.8M GROUND TO UP
89	WATERBODY AREA	683670.476	989147.683	15.285	0.800	16.085	8.944634	76.67055	0.8M GROUND TO UP
90	WATERBODY AREA	685294.676	994678.256	4.335	1.000	5.335	8.994871	76.685327	1.0M GROUND TO UP

91	WATERBODY AREA	685104.427	995426.185	5.276	1.000	6.276	9.001332	76.683854	1.0M GROUND TO UP
92	RIVER CROSSING	684222.174	998267.847	4.121	1.500	5.621	9.027026	76.675944	1.5M GROUND TO UP
93	WATERBODY AREA	683681.326	998286.480	7.097	0.500	7.597	9.027295	76.670999	0.5M GROUND TO UP
94	CANAL CROSSING	684168.391	1004008.880	29.944	0.800	30.744	9.079058	76.676024	0.8M GROUND TO UP
95	WATERBODY AREA	680192.683	1013807.529	32.356	0.300	32.656	9.16778	76.639245	0.3M GROUND TO UP
96	WATERBODY AREA	679930.875	1014821.121	35.808	0.500	36.308	9.176897	76.638088	0.5M GROUND TO UP
97	KARINGALICHAL LAKE	680318.104	1017571.709	6.375	1.500	7.875	9.201765	76.641246	1.5M GROUND TO UP
98	LAKE & CANAL	680635.781	1020118.762	7.211	3.000	10.211	9.224489	76.643625	3.0M GROUND TO UP
99	ACHANKOVIL RIVER	680499.485	1021253.760	8.636	0.500	9.136	9.235044	76.643053	0.5M GROUND TO UP
100	WATERBODY AREA	680679.577	1022309.889	6.811	1.500	8.311	9.2445882	76.644745	1.5M ROAD TO UP
101	WATERBODY AREA	680137.809	1022810.933	7.144	1.500	8.644	9.249132	76.639838	1.5M GROUND TO UP
102	CANAL CROSSING	679894.714	1027890.755	16.823	0.500	17.323	9.295089	76.637827	0.5M CULVERT TO UP
103	CANAL CROSSING	682385.836	1027651.931	17.422	0.500	17.922	9.292813	76.660486	0.5M GROUND TO UP
104	WATERBODY AREA	682113.876	1028515.561	4.207	2.000	6.207	9.300632	76.658048	2.0M CANAL TO UP
105	WATERBODY AREA	682098.457	1028394.638	6.398	0.500	6.898	9.299541	76.657902	0.5M GROUND TO UP
106	WATERBODY AREA	681542.061	1029066.919	4.058	3.000	7.058	9.305654	76.652862	3.0M GROUND ROAD TO UP
107	WATERBODY AREA	681464.177	1029232.703	2.733	3.000	5.733	9.307147	76.652163	3.0M ROAD TO UP
108	WATERBODY AREA	680078.175	1030622.775	5.178	2.000	7.178	9.319765	76.639628	2.0M GROUND TO UP
109	WATERBODY AREA	680415.809	1031314.711	5.523	1.800	7.323	9.326015	76.642746	1.8M GROUND TO UP
110	RIVER CROSSING	680165.073	1032066.201	3.733	0.800	4.533	9.332808	76.640446	0.8M GROUND TO UP
111	RIVER CROSSING	680182.961	1032048.218	2.863	2.700	5.563	9.332679	76.640611	2.7M GROUND ROAD TO UP
112	RIVER CROSSING	680382.499	1031885.871	3.240	2.700	5.940	9.331186	76.642435	2.7M GROUND TO UP
113	RIVER CROSSING	680236.748	1031942.074	4.015	3.000	7.015	9.33175	76.641127	3.0M GROUND TO UP
114	WATERBODY AREA	680024.612	1033009.300	5.554	1.000	6.554	9.341764	76.639276	1.0M GROUND TO UP
115	WATERBODY AREA	679750.602	1033629.856	8.819	0.500	9.319	9.346962	76.636759	0.5M GROUND TO UP
116	WATERBODY AREA	680588.504	1033357.692	5.554	0.500	6.054	9.344485	76.644375	0.5M GROUND TO UP
117	WATERBODY AREA	680569.593	1033401.453	5.409	0.800	6.209	9.344873	76.644199	0.8M CONCRETE TO UP
118	RIVER CROSSING	679321.067	1038294.742	7.353	0.200	7.553	9.389447	76.633023	0.2M ROAD TO UP
119	WATERBODY AREA	671485.175	1053231.339	3.085	1.000	4.085	9.524558	76.56209	1.0M GROUND TO UP
120	WATERBODY AREA	671525.463	1053215.956	3.791	1.800	5.591	9.524191	76.562558	1.8M ROAD TO UP
121	WATERBODY AREA	671551.964	1053249.138	1.562	2.000	3.562	9.524692	76.562914	2.0M GROUND TO UP
122	STREAM ROAD CROSSING	670230.979	1055123.422	2.141	1.800	3.941	9.54169	76.550988	1.8M CONCRETE TO UP
123	STREAM ROAD CROSSING	670236.663	1055147.828	2.030	1.800	3.830	9.541913	76.551016	1.8M ROAD TO UP
124	WATERBODY AREA	669891.542	1055200.140	2.116	1.000	3.116	9.54241	76.547857	1.0M ROAD TO UP
125	WATERBODY AREA	669541.235	1055868.874	3.558	1.000	4.558	9.548465	76.544659	1.0M COMPOUND WALL TO UP
126	RIVER CROSSING	668862.793	1058217.789	2.384	0.800	3.184	9.56971	76.538623	0.8M ROAD TO UP
127	RIVER CROSSING	668762.197	1058374.659	2.391	0.800	3.191	9.571149	76.537713	0.8M PILLAR TO UP
128	RIVER CROSSING	668743.060	1061241.258	4.360	0.800	5.160	9.597074	76.537633	0.8M PILLAR TO UP
129	RIVER CROSSING	668818.178	1061272.349	4.453	0.800	5.253	9.59734	76.53834	0.8M CONCRETE TO UP
130	RIVER CROSSING	669679.694	1062731.232	3.156	0.500	3.656	9.610494	76.546213	0.5M ROAD TO UP
131	RIVER CROSSING	669672.303	1062740.153	3.988	1.000	4.988	9.610582	76.546186	1.0M CONCRETE TO UP
132	WATERBODY AREA	670470.581	1063705.986	16.693	1.500	18.193	9.619269	76.54979	1.5M ROAD TO UP
133	WATERBODY AREA	670517.853	1063634.477	23.831	1.500	25.331	9.618655	76.55177	1.5M CONCRETE WALL TO UP
134	CANAL CROSSING	671992.715	1061882.980	3.527	1.000	4.527	9.602832	76.567251	1.0M CONCRETE WALL TO UP
135	POOVATHU MOODU BRIDGE	671842.219	1065051.344	4.561	1.800	6.361	9.631392	76.56605	1.8M CULVERT CONCRETE TO UP
136	WATERBODY AREA	672237.789	1067562.527	4.472	1.000	5.472	9.65408	76.569759	1.0M CONCRETE TO UP
137	WATERBODY AREA	672348.229	1068176.411	4.050	1.400	5.450	9.659627	76.57079	1.4M ROAD TO UP
138	WATERBODY AREA	663185.580	1087986.723	2.355	2.000	4.355	9.839119	76.488063	2.0M ROAD TO UP
139	RIVER CROSSING	662781.598	1088534.475	2.552	2.000	4.552	9.844082	76.484434	2.0M MUDD ROAD TO UP
140	WATERBODY AREA	660379.730	1094203.900	6.585	0.500	7.085	9.89544	76.462763	0.5M MUDD ROAD TO UP
141	WATERBODY AREA	660434.137	1094217.988	5.217	2.000	7.217	9.895554	76.463255	2.0M ROAD TO UP
142	WATERBODY AREA	652446.407	1099065.399	3.884	1.000	4.884	9.939705	76.390607	1.0M GROUND TO UP
143	WATERBODY AREA	652463.514	1098957.755	4.755	1.000	5.755	9.93873	76.390758	1.0M CONCRETE WALL TO UP
144	WATERBODY AREA	650690.494	1100305.977	3.270	0.500	3.770	9.950982	76.374673	0.5M ROAD TO UP
145	WATERBODY AREA	650141.082	1101294.212	2.613	1.000	3.613	9.959941	76.369666	1.0M CONCRETE TO UP
146	WATERBODY AREA & River	648818.963	1103016.101	1.551	1.500	3.051	9.975564	76.357672	1.5M GROUND TO UP
147	WATERBODY AREA & River	648979.544	1103412.874	1.802	1.500	3.302	9.979146	76.359149	1.5M GROUND TO UP
148	WATERBODY AREA & River	650160.191	1106060.744	3.205	1.000	4.205	10.003047	76.370014	1.0M GROUND TO UP
149	WATERBODY AREA & River	651991.284	1109021.833	2.240	0.500	2.740	10.029743	76.386803	0.5M ROAD TO UP
150	WATERBODY AREA	651995.776	1108965.686	6.275	0.500	6.775	10.029347	76.386875	0.5M ROAD TO UP
151	CANAL CROSSING	651977.057	1109174.338	3.522	1.500	5.022	10.031126	76.386712	1.5M CONCRETE TO UP
152	CANAL CROSSING	652257.425	1110972.016	2.656	0.500	3.156	10.047364	76.389317	0.5M MUDD ROAD TO TOP
153	CANAL CROSSING	652475.276	1111345.634	2.283	0.500	2.783	10.05074	76.391343	0.5M CULVERT PILLAR TO UP
154	PERIYAR RIVER	651771.399	1119436.146	2.788	1.000	3.788	10.123921	76.385232	1.0M CONCRETE WALL TO UP
155	LAKE	651226.508	1119804.555	4.810	1.500	6.310	10.127271	76.380271	1.5M GROUND TO UP
156	MANSALLY RIVER	650128.215	1127272.857	4.126	1.500	5.626	10.194843	76.370538	1.5M GROUND TO UP
157	CHALAKUDY RIVER	645603.178	1130393.262	7.712	2.200	9.912	10.222954	76.329595	2.2M GROUND TO UP
158	WATERBODY AREA	637694.597	1143522.522	6.540	1.500	8.040	10.342231	76.257632	1.5M CEMENT CONCRETE TO UP
159	WATERBODY AREA	638242.096	1142368.676	4.901	0.500	5.401	10.331959	76.262535	0.5M GROUND TO UP
160	WATERBODY AREA	638316.034	1142370.256	5.390	0.500	5.890	10.331773	76.262638	0.5M ROAD TO UP
161	CANAL CROSSING	636037.574	1148044.269	4.850	0.500	5.350	10.383177	76.242662	0.5M CONCRETE CULVERT TO UP
162	CANAL CROSSING	635915.475	1148010.785	4.479	0.500	4.979	10.382878	76.241546	0.5M ROAD CANAL TO UP
163	KARUVANNAR RIVER	633656.907	1150157.557	3.093	1.500	4.593	10.402388	76.220976	1.5M ROAD TO UP
164	WATERBODY AREA	632365.000	1151467.795	3.369	0.800	4.169	10.414262	76.209229	0.8M CEMENT CONCRETE TO UP
165	WATERBODY AREA	632078.170	1151887.977	2.972	1.000	3.972	10.418063	76.206674	1.0M GROUND TO UP
166	CANAL CROSSING	632516.456	1158474.050	3.341	1.000	4.341	10.477618	76.210862	1.0M ROAD TO UP
167	WATERBODY AREA	629085.990	1170007.280	4.146	1.000	5.146	10.582021	76.179911	1.0M CANAL ROAD TO UP
168	PUZHAKKAL RIVER	629057.440	1169966.454	3.694	1.000	4.694	10.581641	76.179653	1.0M GROUND TO UP
169	ALOOR RIVER	622034.051	1175530.738	7.840	1.000	8.840	10.632191	76.115661	1.0M MUDD ROAD TO UP
170	ALOOR RIVER	622143.270	1175387.917	7.973	1.000	8.973	10.6309	76.116647	1.0M ROAD CULVERT TO UP
171	WATERBODY AREA	620921.297	1176059.394	7.253	2.000	9.253	10.637013	76.10548	2.0M ROAD TO UP
172	WATERBODY AREA	620929.393	1176141.244	8.889	2.000	10.889	10.637728	76.105616	2.0M MUDD ROAD TO UP
173	WATERBODY AREA	620937.494	1176143.995	8.112	2.000	10.112	10.637771	76.105679	2.0M ROAD TO UP
174	LAKE WATERBODY AREA	615242.076	1183803.226	3.190	2.000	5.190	10.707214	76.053816	2.0M STONE TO UP
175	LAKE	615219.431	1183876.600	2.165	2.000	4.165	10.707879	76.053618	2.0M MUDD ROAD TO UP
176	CANAL CROSSING	615164.976	1184022.463	3.313	2.000	5.313	10.709199	76.053127	2.0M ROAD TO UP
177	WATERBODY AREA	612315.276	1188636.819	13.463	2.000	15.463	10.75101	76.027195	2.0M CANAL MUDD ROAD TO
178	WATERBODY AREA	612255.830	1188692.687	2.976	2.000	4.976	10.751519	76.026681	2.0M GROUND TO UP
179	CHOVVA PUZHA	567291.594	1278730.647	1.958	1.000	2.958	11.566854	75.617174	1.0M GROUND TO UP
180	KUTTIYADI RIVER	567299.331	1278733.445	1.997	1.000	2.997	11.566879	75.617246	1.0M GROUND TO UP
181	KUTTIYADI RIVER	567404.233	1278737.452	2.029	0.500	2.529	11.566914	75.618208	0.5M GROUND TO UP
182	CANAL CROSSING	566650.622	1282986.757	6.575	0.500	7.075	11.605354	75.611379	0.5M GROUND TO UP
183	CANAL CROSSING	566091.193	1283451.200	5.275	0.500	5.775	11.609569	75.606267	0.5M CULVERT TO UP

184	CANAL CROSSING	565163.980	1284233.422	5.599	1.000	6.599	11.616657	75.597767	1.0M MUDD ROAD GROUND TO
185	CANAL CROSSING	563980.396	1285472.447	5.616	0.500	6.116	11.627883	75.586933	0.5M CULVERT CORNER TO UP
186	CANAL CROSSING	563831.895	1285805.297	4.407	1.000	5.407	11.630893	75.58558	1.0M CULVERT WALL TO UP
187	WATERBODY AREA	559051.455	1299992.316	1.162	0.500	1.662	11.759105	75.540682	0.5M ROAD TO UP
188	CANAL CROSSING	558847.799	1300975.538	7.832	0.300	8.132	11.767827	75.5394489	0.3M ROAD TO UP
189	ANJARAKANDY RIVER	552987.810	1306943.584	2.121	1.000	3.121	11.823079	75.48769	1.0M CANAL TO UP
190	KUPPAM RIVER	529257.383	1329450.306	1.582	0.500	2.082	12.026058	75.268793	0.5M GROUND TO UP
191	VAYALAPRA RIVER	526895.780	1332130.490	1.924	0.500	2.424	12.050315	75.247116	0.5M PILLAR TO UP
192	WATERBODY AREA	531622.053	1326562.175	1.562	0.800	2.362	11.999926	75.290485	0.8M PILLAR TO UP
193	WATERBODY AREA	544235.537	1311886.956	4.044	2.000	6.044	11.867071	75.406155	2.0M ROAD TO UP
194	WATERBODY AREA	546727.228	1309594.758	4.182	0.500	4.682	11.846309	75.429001	0.5M RIVER TO UP
195	WATERBODY AREA	546784.032	1309502.267	3.793	1.000	4.793	11.845471	75.429519	1.0M GROUND TO UP
196	WATERBODY AREA	550823.771	1307655.279	1.207	0.800	2.007	11.828704	75.466562	0.8M ROAD TO UP
197	WATERBODY AREA	553124.399	1307036.524	2.267	1.000	3.267	8.517143	76.892037	1.0M CULVERT CORNER TO UP

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